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ABSTRACT

This first volume of a sourcebook presents a framework for identifying best practices of integrating career preparation into the community college. An introduction identifies seven domains of competency critical for postsecondary students: foundation academic competencies, education for citizenship, job specific/technical skills, career exploration, systems utilization skills, generic technical skills, and workplace organization experience. These teaching approaches are then described: infusion, hybrid courses, linked clusters, authentic assessment, and work-based learning. Chapters 1-6 describe the practices associated with each of the domains of career preparation--except the domain of specific technical skill. These chapters examine the specific practices of exemplary community colleges to illustrate how the approaches can be used to create educational institutions that are flexible, innovative, and effective. Chapter titles are as follows: (1) The Provision of Foundation Academics; (2) Teaching Generic Technical Skills; (3) Introducing Systems Utilization Skills; (4) Workplace Organization Experience; (5) Career Exploration; and (6) Incorporating Education for Citizenship: The Economic, Political, and Social Aspects of Work. Chapter 7 outlines ways to begin the process of reforming the ways community colleges and technical institutes go about devising their programs. Contains 42 references, a 30-item bibliography, and an appendix of sources of information. (YLB)

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National Center for Research in
Vocational Education

University of California, Berkeley

A Sourcebook for Reshaping the Community College Curriculum Integration and the Multiple Domains of Career Preparation

Volume I: Framework and Examples

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A SOURCEBOOK FOR RESHAPING THE COMMUNITY COLLEGE: CURRICULUM INTEGRATION AND THE MULTIPLE DOMAINS OF CAREER PREPARATION

Volume I: Framework and Examples

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These two volumes developed from an earlier examination of the integration of academic and occupational education in community colleges and technical institutes carried out in 1991, resulting in an NCRVE monograph (Grubb & Kraskouskas, 1992). Since then, an advisory committee convened by Terry O'Banion and composed of administrators and faculty representing the League for Innovation in the Community College and the National Council on Occupational Education helped guide a further examination of integration and Tech Prep in community colleges, documented in a joint monograph (Grubb, Badway, Bell, & Kraskouskas, 1996). We are indebted to Sherri Kantor for her efforts to improve the clarity of this document. We thank them all.

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EXECUTIVE SUMMARY

Over the past several years, community colleges and technical institutes have attempted to meet employers' demands for graduates competent in the "new basic skills" required for organizational effectiveness by integrating academic and occupational education. But the variety of skills necessary for students to master and for community colleges to impart are different and much more comprehensive than either basic academic skills or conventional occupational courses convey. One purpose of this monograph, then, is to identify and describe areas or domains of competency that address the needs expressed by employers, the skills students need to progress through postsecondary education and the labor market itself, and the knowledge that educators have always wanted for their students. These domains are as follow:

- Foundation academic competencies—reading, writing, calculation, and science competencies learned in the way in which they are applied in everyday practice
- Education for citizenship education—the economic, political, and social aspects of work
- Job specific/technical skills—the technical and production skills required for a particular occupation
- Career exploration—the match between self-knowledge and labor markets
- Systems utilization skills—understanding the big picture of how diverse personnel, time, capital, material, and facilities interact to shape an organization's performance
- Generic technical skills—tools for designing and analyzing organizational systems, including software applications, recordkeeping procedures, interpretation of visual data representations, quality assurance techniques, and occupational and public safety standards
- Workplace organization experience—the commonalties between all other domains and an actual work setting;

Although colleges have traditionally attempted to prepare students for careers through general education, its distributed structure of independent courses and prevalent

lecture teaching and assessment methods make it a weak approach to the competencies we have identified. Innovative institutions have devised other ways of incorporating these domains into their curriculum, including infusing foundation skills and work-related applications into existing courses; blending academic content with career perspectives in hybrid courses; linking academic and occupational courses and perhaps work-based learning into a cluster or learning community of students and faculty; authentic forms of assessment by which students demonstrate a variety of communication, mathematical, technical, and systems utilization competencies; and work-based learning which allow students to connect the knowledge learned in school to actual practice.

With the exception of the job specific domain, some version of which every college has in place, we found that colleges are most likely to adapt courses in reading, composition, math, and science to the career preparation needs of students. To incorporate career preparation into transfer level courses, colleges have experimented with writing-intensive occupational courses, as well as hybrid courses which apply ethical or career-related themes to literature and composition, and clusters of courses connected by an occupational or technology theme. Sections of courses "especially appropriate for" career clusters maintain traditional outcomes and academic rigor, at the same time they incorporate texts, learning activities, and student assessments related to usage in everyday practice. Two approaches are predominant at the Associate degree level: infusion of work-related applications into academic courses and of reading, writing, and math skills into occupational courses; and "applied academics," which are either occupational courses with an academic bent (Pharmaceutical Math, Police Science Report Writing) or academic courses with an occupational focus (Business English, Technical Physics). In addition, a few colleges have taken advantage of natural overlaps between concepts and their practical uses to link courses (i.e., medical terminology and anatomy and physiology). At the developmental level, learning communities in which a cohort of students concurrently enroll in a cluster of occupational and academic courses with language support offer access to career preparation for individuals whose low basic skills block their way to economic advancement.

Generic technical skills tend to be offered as stand alone computer or quality management courses, rather than their more powerful use as tools to complete serious work-like simulations or culminating projects. Capstone courses or projects demonstrating a student's ability to plan, execute, and present a work-like product encompassing all

aspects of a production or service system are valuable instruments for communicating to students themselves and to potential employers what they know and are able to do.

Career exploration is the least frequent domain formally addressed by community colleges, a particularly worrisome finding since many students use the college to experiment with the options available to them, "milling around" in unfocused courses of study until they find an area of interest that matches their personal attributes. Colleges have been slow to publish retention, graduation, and placement outcomes for each course of study so that students can understand the employment outcomes they might expect from a certificate or degree; we found only one college which did so.

Although new federal reforms such as the School to Work Opportunities Act recommend that programs incorporate both school- and work-based learning, few colleges require or even offer internships or cooperative education for technical students; almost none offer work-based education for liberal arts majors; and only one college in this survey had a well-developed mechanism for connecting the two forms of learning. Connecting activities or seminars are critical for helping individuals see themselves as *students* in both settings—in the classroom and in the workplace—beginning a valuable foundation for life-long learning.

Education for citizenship separates "job training" from "education," and we have seen numerous examples of innovations which demonstrate that adapting liberal arts courses to the career interests of students need not reduce their rigor or the integrity of their content—career preparation and citizenship education need not be independent of one another. Innovative colleges have integrated the knowledge of political, economic, and cultural dimensions of our society with work-related perspectives, helping students find connections between career preparation and the humanities and social science component of the general education sequence. For students pursuing career goals, adapted social science and humanities courses are especially promising, since occupational students often postpone or avoid these general education requirements, precluding them from degree completion.

The monograph describes, and the accompanying volume provides examples of, exemplary programs that avoid the separation between theory and the practice of a variety of competencies on a variety of scales. In addition, we outline implementation strategies

that colleges have found successful for workforce development reform, which call for participation and support from both administrators and faculty—a top-down design pattern coupled with bottom-up authority to plan and execute reforms. Every college described barriers and uncertainty in the process of devising innovative programs. However, the potential benefits are enormous because the results would be two-year colleges that can provide their students, and the employers for whom they will work, the full range of competencies required for the modern world.

INTRODUCTION:
THE MULTIPLE DOMAINS OF CAREER PREPARATION

Community colleges and technical institutes constitute one of the most significant workforce preparation developments of the twentieth century. Nearly half of all adults take at least one course in a community college, and about 45% of all undergraduates enroll first in a two-year college (National Center for Educational Statistics, 1994). They are the one educational institution simultaneously providing initial preparation for work, upgrade training to those needing additional skills, retraining for displaced workers and others who want to change careers, and second-chance training for individuals who need some combination of basic (or remedial) academic education and technical skills (Hansen, 1993). In most states, they are nearly ubiquitous, providing a source of both academic and occupational instruction within commuting distance of the majority of the population.

At the same time, for the past decade employers have been criticizing the work readiness of those they hire, complaining that many graduates of high schools, community colleges, and even four-year colleges do not possess the basic educational skills needed to learn on the job (Grubb, 1996a; SCANS, 1991; Van Horn, 1995; Zemsky, 1994). Every level of the educational system, including community colleges, has been called upon to be more practical; more connected with the market for labor; and more in touch with the practical applications of research, technology, and basic academic disciplines (Guthrie, 1991). Over the past several years, one way in which community colleges have responded to the pressures to meet this human capital imperative has been the many efforts to integrate academic and occupational education—that is, to incorporate more "basic" or academic content into occupational programs so that graduates will have both the basic reading, writing, and mathematical skills and some of the "higher-order" or problem-solving skills demanded by the business community and various educators. We have written extensively about many different approaches to integration (Grubb, Badway, Bell, & Kraskouskas, 1996; Grubb & Kraskouskas, 1992), and there appears to be a growing interest among community colleges in these innovative practices.

However, there is a serious problem with the conventional statement from employers about the skills missing in the workforce. As others have noted (Grubb, 1996b; Hull, 1993), employers are often unclear about specifically which competencies are inadequate in their workers; they frequently glide from complaints about basic academic

skills—reading and math—to complaints about work habits and motivation, even though the two are quite different and must be remedied in distinctly different ways. The skills employers stress are, not surprisingly, centered on their own needs, and they neglect a number of competencies that are crucial to the students involved. When we look more carefully at *both* the demands of employers *and* the needs of students trying to make their way through community colleges, we can see that the competencies necessary for students to master and for community colleges to convey are much more varied than either basic academic skills or the kinds of skills articulated by employers—often referred to as SCANS skills because of their description in the 1991 report from the Secretary's Commission on Achieving Necessary Skills. In the first section of this introduction, then, we briefly outline seven competencies required by all students for career preparation. In effect, we argue throughout this monograph that community colleges need to consider *all* these competencies, not merely the basic academic skills and the job-specific technical skills that have been the subject of conventional occupational and academic courses, respectively.

Having identified these seven domains of competency, the problem facing community colleges and technical institutes is how to provide *all* the experiences—coursework, work-based learning, labs and workshops, and other nontraditional learning activities—that will convey these competencies.[1] Because so much confusion exists over the ways in which community colleges can address workforce education, we have examined the practices in place at a variety of colleges across the nation. (We describe our efforts to find out about these practices in the Appendix.) Efforts to integrate academic study and career preparation vary greatly. We found many ambitious efforts in modules and courses that addressed some aspects of career preparation, some pockets of creativity in assembling programs that address multiple work-related competencies, and a scant group of campuses in which the fundamental purposes of education and its degree components have been reexamined in the light of today's changing workplace and social demands. Throughout this volume, we draw upon the practices we uncovered to illustrate how other community colleges and technical institutes might adapt novel practices for the benefit of their own students. Of course, there is always a danger in describing exemplary practices in

[1] The community college serves a variety of students requiring a variety of curriculum. Kantor (1994) distinguishes among the emerging workforce learner (yet to be employed; training for a first career), the entrepreneurial workforce learner (small business owners who demand applied knowledge), the transitional workforce learner (displaced or disenfranchised workers requiring immediate, short-term training), and the existing workforce learner (employed, with a natural setting in which to apply knowledge). See also Bailey, 1987.

any institution: other campuses may have implemented similar practices but were not included in our survey; practices may have altered by the time this is read because personnel or regulations have changed; campuses operate under vastly different conditions, so that innovations in one college may be inappropriate for another; or we may have failed to ask the right questions of the programs we examined. Even so, with apologies for incomplete data collection and with anticipation that environments shift, we describe a number of select programs that illustrate the possibilities for career preparation that is truly multidimensional and that inform our understanding of the capacity of the community colleges to respond to a changing society and economy.

In presenting these innovative practices, we take two approaches. In Chapters 1 - 6 of Volume I, we describe the practices associated with each of the domains of career preparation—except the domain of specific technical skill, which is already well represented in occupational courses. However, these are *our* descriptions, not those of the instructors who have devised them. Therefore, in Volume II of this Sourcebook, we include the course syllabus, descriptions, and other materials that these instructors have devised and we refer to these materials throughout this first volume (see "Directions for Using Volumes I and II" at the end of this Introduction). While the two sets of materials can be used independently of each other, we have found that they are complementary: the course materials in Volume II provide more vivid illustration of what these novel approaches accomplish, while our analysis of these materials in Volume I places them in the larger national and institutional context.

Finally, in Chapter 7, we outline some of the ways of getting from here to there—of beginning the process of reforming the ways community colleges and technical institutes go about devising their programs. The area of innovative workforce programs is an excellent example of where the community college must work together as a *community*: both administrators and their support, and instructors and their wholehearted participation—both top-down and bottom-up strategies, so to speak—are necessary for these innovations to develop, endure, and spread. But we stress that the potential benefits are enormous because the results would be two-year colleges that can provide their students, and the employers for whom they will work, the full range of competencies required in the modern world.

The Domains of Career Preparation

Based on the needs expressed by employers, the skills that students need to make their way through postsecondary education and the labor market itself, and the knowledge that educators have always wanted for their students, we can identify seven areas or domains of competency that are critical for postsecondary students—indeed, for *all* postsecondary students who attend two-year colleges to improve their chances in the labor force, regardless of whether they have declared themselves occupational or transfer students.

Foundation Academic Competencies

To assure that students have adequate competency in reading, composition, and math to benefit from instruction, colleges typically assess first-time students for placement in the appropriate level of academic courses. State policies and local practices vary about whether placement assessment is required prior to enrollment in any course, or only prior to enrollment in an English or math course. For students with significant skill deficits in reading, writing, mathematics, and sometimes science, community colleges offer a variety of remedial courses (often termed developmental education). These courses are often noncredit, although they entail tuition costs equal to credit courses; they are typically structured to build progressively the skills necessary for successful academic and occupational study.

The most advanced levels of courses in community colleges and technical institutes are those which transfer to four-year institutions. They typically address a range of complex cognitive capabilities, including problem-solving, reasoning, organizing resources, and acquiring and using information. Because these are the skills the SCANS report identifies as most in demand by employers, the prevailing wisdom is that these courses best prepare students for future careers. However, the workplace generally requires applications of these foundation skills in a far different context than is found in the conventional classroom. Carnevale, Gainer, and Meltzer (1990) note a number of contrasts between academic requirements for communication and numeracy and those used in work situations:

- reading well-written prose of the academic world versus work requirements to decipher specialized vocabulary and written explanations that are not clear

- composition requirements of a minimum word count versus workplace communication that values conciseness

- computing individual problems versus workplace problems that require reading words and numbers, determining what parts of the information presented are pertinent and what formula(s) apply

Another contrast involves the information used to complete academic and work tasks. Firms typically base decisions on primary or empirical sources of information—observations, document review, informal and formal interviews, and empirical comparisons—rather than on secondary sources in books or journals, and convey information graphically, using diagrams, charts, and graphs. Academic requirements for research papers which use a specified number of books and journals and rely solely on textual material directly contradict the skills needed for employment.

In addition, there exists a serious mismatch between how employers use the term "math competency" and the curricular practices of colleges. Employers note that problem-solving and interpretation are required even when working with the most basic levels of calculation, but that advanced math courses are often unconcerned about industry use of mathematics. Conversely, colleges seek to improve student skills by requiring additional advanced math, while ignoring skills needed for manufacturing and for quality control in all industries such as statistics.[2]

A second group of courses meets Associate degree requirements but do not transfer as general education requirements. Some of these are less complex versions of baccalaureate level courses—second-tier courses that introduce and practice skills that are prerequisite to transfer level courses and have titles like Elementary or Intermediate Algebra and Fundamentals of English Grammar and Composition. Another set of nontransfer courses are often called "applied" because they emphasize work-related applications of conventional academic topics, explicitly connecting skills that are learned in the classroom with their uses in everyday practice. In our survey of practices, over half of applied mathematics and communications courses were targeted to technical or business majors;

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[2] We thank Larry Smith, Technical Training Director of Teepak Corporation, Danville, Illinois, for pointing this out to us. Perkins (1993, p. 32) refers to curriculum which does not connect to practical application as "quadratic education," as illustrated by the emphasis on quadratic equations and other skills rarely used in everyday practice.

others were either generic to all occupations or career-specific. In these courses, students practice writing business and technical reports; compute profit distribution, depreciation, purchase discounts and mark-ups; or manipulate technical formulas for measurement, circuitry, or machine technology.

Exemplary programs, then, avoid the separation between theory and practice at all levels of communication and calculation instruction, smoothing the direct transfer of skills from the classroom to professional performance. They are characterized by curriculum and teaching strategies that are organized by job tasks, not discrete basic skills; include problems and simulated situations that call for the use of basic skills as they will be used on the job; provide opportunities for complex thinking and problem solving; use actual job materials as instructional texts; provide the opportunity to work and learn in teams; and build knowledge of job content.

Education for Citizenship: The Economic, Political, and Social Aspects of Work

Exposure to the economic, political, and social aspects of life is perhaps the clearest distinction between job training and education. The new "smart workers" of the 20th century are ready to assume political and social, as well as economic roles in the community. The specter of "technopeasants" (Hersch, 1983), technically qualified but lacking an understanding of human issues, urged the Commission on the Future of Community Colleges (1988) to state,

> Students in technical studies should be helped to discover the meaning of work. They should put their special skills in historical, social, and ethical perspective. Those in traditional arts and sciences programs should, in turn, understand that work is the means by which we validate formal education. (pp. 20-21)

Of all the domains, the greatest disagreements between employers and community college faculty probably involve the relative importance of courses in social and cultural institutions. While roughly half of general education requirements fall in the humanities (e.g., history, geography, sociology, political science, and philosophy), they are regarded by employers as much less important than courses in the more utilitarian areas of English, mathematics, computer literacy, and career management (Armistead, Lemon, & Perkins, 1989). Students also tend to place low value on education for citizenship, based on

Cohen's (1988) findings that about half of community college students enroll in vocational programs that do not require general education.

In addition to the low employment benefits, faculty suggest that another reason students fail to enroll in courses related to social and cultural institutions is that those courses emphasize knowledge over performance and rely heavily on reading and writing. As one liberal arts instructor noted,

> Many . . . "hands-on" students have not really enjoyed reading or writing, so they tend to feel out of place in a liberal arts course . . . [conversely] introduction of almost any problem is absolutely what brings out the best in these students. In listening, answering questions, and writing, these students can seem very mediocre, but present them with a problem to resolve and they become amazingly alert, adequate, and full of great ideas.

Citizenship issues such as the role work plays in society, the causes and effects of technological developments, the evolution of American work ethic concepts, the role of individual workers within an organization, the history of occupations and labor movements, or public policies toward technology and employment blend academic tradition with the occupational interests of students.

Job Specific/Technical Skills

The most common understanding of career preparation describes its most narrow dimension—technical and production skills required to operate equipment and to perform the tasks and procedures of a particular occupation. Most occupational programs in community colleges concentrate on this domain; a portion of each course or program includes laboratory or shop exercises—"hands-on" activities similar to those in specific jobs. However, the American economy is quite large and diversified, industrial and commercial machinery has short cycles of obsolescence, and firms vary in how they organize work, so that the essential skills required in any specific occupation cannot be imparted with any certainty.[3] For these reasons, many industry advisory councils now

[3] The inability of community colleges—or any other educational institution—to provide current production skills is largely a function of the acceleration of change. Computer-based technology has expanded rapidly, and technical education faculty who received their training in the pre-microcomputer era may have lagged behind. Costs for modernization are enormous, and even when colleges have purchased new machinery or equipment, few have undertaken the staff development necessary to teach advanced technologies. Further, even when training and equipment reflect prevailing processes and standards, obsolescence strikes swiftly. As an example, the Institute of Electrical and Electronic Engineers estimates that an electrical engineering degree becomes obsolete within 18 months of its award. See Reid (1995) and DePeitro et al. (1989).

recommend that colleges train students in generic technical and system utilization skills (described below), and that firms provide the job-specific training appropriate to their technology and production methods.

Finally, an emphasis on technical and production content takes a narrow view of work preparation. In this conception, jobs are viewed as a fixed bundle of tasks and skills, rather than an interaction between the work environment, other employees, and the characteristics of the individual worker (Berryman & Bailey, 1992). Employers define a broader view of work, complaining that schools have strayed too far in the direction of narrow vocationalism, rather than emphasizing the type of generic skills which are described in the next sections (Committee for Economic Development, 1985).

Increasingly, a good deal of job-specific training provided by two-year colleges takes place within Workforce, Economic Development, or Continuing Education Centers, which provide education to particular firms under contract—often referred to as contract education or customized training. One important difference between contract education aimed at currently employed workers and the regular career preparation programs of community colleges and technical institutes is that employers help define the content of contract education. They can, therefore, specify if certain general or "academic" skills are required, and, if certain highly job-specific skills are necessary, they can be taught at the work site. A critical flaw in the community college organizational structure is that feedback about employer expectations and changes in production methods or technology and work-based learning approaches does not naturally flow from contract or customized training to instructors in other divisions of the campus.

Some colleges have adopted Educator-in-the-Workplace programs in which academic and occupational faculty, counselors, and administrators spend unpaid or paid time observing or working at a local firm as a way to familiarize instructors with the everyday applications of academic knowledge so that they can bridge the gap between school-based learning and workplace expectations with their students. **[II–103, 105]**

Career Exploration

Career exploration is a deliberate process for becoming aware of personal interests and abilities, and ideally introduces students to a variety of career clusters and their

education and training requirements, working conditions, common tasks, advantages and disadvantages, and lateral and vertical career ladders. In addition, because the economic returns to postsecondary education depend on how much and which field of study a student completes, individuals need to be well-informed about local and national labor markets—the economic consequences of their decisions (Grubb, 1995b, Ch. 3).

Unfortunately, many students enter community colleges without occupational goals or clear understanding of their own talents; they are "experimenters," using the college to experiment with the options available to them, trying to find a field of study which they might like and where they might excel (Grubb, 1996b, Ch. 2). Until they find an area of interest, they are likely to "mill around," taking coursework with no distinct focus. We suspect that comprehensive community colleges have underestimated the magnitude of this problem, even though instructors refer to it constantly: "experimenters" are unlikely to be highly motivated since they have not yet decided what to do in life and, therefore, create problems for instructors.

Given this issue, we would expect high-quality programs to include self-knowledge of personal attributes; education/training requirements; and the economic consequences of career selection.

Skills Related to Utilizing Systems

The ability to understand how social, organizational, and technological systems function and how to operate effectively within them is often the basis for acquiring rewarding positions and promotion in the high performance workplace. In this environment, understanding how parts of the organization are connected is essential because management and line staff share responsibility to identify trends and anomalies in the company's performance. Employees work in teams to allocate resources (time, capital, material, facilities, and personnel), to monitor quality, and to keep pace with changing technologies and work processes.

These are "new basic skills" for community colleges, and they require innovative teaching approaches and novel content. Rather than being dominated by a lecture approach, which places control of learning in the hands of instructors and relegates students to passive reception of knowledge, programs that make greater use of project and

occupationally oriented problems allow students to be actively engaged in problem solving. Teamwork, in which diverse individuals negotiate and teach one another new skills, replaces individual assignments and assessment. Certificate and degree programs which feature work-like simulations or culminating activities help students understand the complex interrelationships among divisions of a firm and between internal and external customers, helping to overcome the piecemeal nature of instruction which occurs in independent courses.

Generic Technical Skills

An array of technical skills required in work can be described as generic—not idiosyncratic to a particular firm or occupation but, rather, transportable among firms. These skills are technical, scientific, or formula *tools* by which organizational or production systems can be operated and analyzed. Students and employees use these tools to recognize and define problems, organize resources, invent solutions, and track and evaluate results. Although this domain has been omitted from standard lists of employer needs and educational outcomes, generic technical skills offer benefits to students and employers alike, both as skills valuable in their own right and as prerequisites to advancement. Generic technical skills include knowledge of software applications; operation of electronic information equipment and processes; business and recordkeeping procedures; creation and interpretation of data representations such as diagrams, flow charts, graphs, and blueprints; quality assurance techniques; and occupational safety and sanitation standards.

Powerful learning conditions occur when these technical tools are used to design or diagnose organizational systems, as described in the next section. This domain may be introduced and practiced in both academic and occupational programs, and fits well with performance-based assessment using work-related simulations. However, general technical skills sometimes present challenges to academic faculty who may lack experience in their use; advanced study coupled with industry practicum for instructors may be required, or trainers from local firms may be employed as adjunct faculty.

Workplace Organization

Classrooms are typically structured and organized differently than are workplaces, creating a gap between a student's training in school and the expectations of the job. School work is typically organized in units, with the completion of one prerequisite to the next.

Tasks are bounded, with explicit criteria and consequences for quality. Assignments are made in advance, with ample time for careful thought and planning. Students set the timing, location, conditions, and tools to use for completing projects—in libraries and homes, at odd hours of the evening or weekend, using a variety of computer hardware and software.

Workplaces are quite different: Equipment is prescribed and is typically located at the work site; tasks are ambiguous and have variable time frames; noise, odor, and activity levels in the environment are uncontrollable; and employees engage in multiple tasks simultaneously—so work is "messy" (Jacobs & Teahen, 1996). On the job, employees become expert through practice: interacting with and learning from co-workers, discovering a variety of solutions for a variety of tasks, and finding shortcuts to make work faster and easier.

Students can master these skills only through experience at an actual work site. At the same time, they can expand their awareness of social issues and interpersonal problems, such as sexual harassment, racial discrimination, unemployment, and economic cycles, and they come to appreciate the different roles and interests of owners, managers, and workers (Weintraub, 1992). But this type of learning requires a connecting mechanism—a formal activity in which students are guided in finding the commonalties between work- and classroom-based learning. Even when students hold part- or full-time jobs, there is rarely any connection made to the college curriculum and so these jobs cannot be exploited for the learning possibilities they offer. While many occupational classes attempt to mimic workplaces, or incorporate labs and workshops that are similar to work tasks, they are unavoidably different from the pace, demands, and complexity of real workplaces. The result is that educational institutions are often mediocre places for learning what "real work" is like.

Exemplary programs conceptualize work-based learning as a laboratory in which concepts and theories introduced in class are applied or observed on the job, while the workplace forms a locus for data collection to be analyzed in class (Heinemann, DeFalco, & Smelkinson, 1991). Connecting activities which guide students to explore or confirm career interests, practice interpersonal skills, and apply skills learned in the classroom to real situations allow students to learn how work is organized and how people behave in work settings.

Approaches to Teaching the Domains of Career Preparation

To a large extent, community colleges have attempted to offer the "new basic skills" to their students through the general education (gen ed) component of graduation requirements and through developmental education that provides basic or remedial academic instruction to those needing it. About half of the 18 to 36 general education credits required for an Associate degree are divided among reading, writing, mathematics, and science, what we term "foundation academics." The other half—humanities, social and political science, history, and fine arts, referred to here as "Education for Citizenship"—is intended to impart citizenship, cultural appreciation, and ethics, as well as critical and analytic thinking. However, gen ed as a means of preparing students for careers has certain limitations. First, students must complete an entire degree program to gain potential benefits, whereas most community college students enroll for only a few courses or for a certificate, which may include few if any general courses.[4] Even for students completing an entire degree program, the typical pattern in which gen ed courses are distributed places on *students* the entire responsibility to make the transfer of knowledge between school and its uses in the workplace, without learning activities or guidance from faculty to assist them.[5]

In addition, gen ed frequently employs teaching methods which contradict what we know about how people learn and transfer their learning from one setting to another in everyday practice. Whereas school learning focuses on learning rules and isolated facts, in everyday practice skills and knowledge are gained while individuals complete tasks or projects. Research by cognitive scientists concludes that experience—*doing*, or engaging in an activity—provides the most effective means of linking the acquisition of knowledge to its use. Moreover, assessment of learning almost always consists of paper and pencil, norm-referenced, multiple-choice tests which stress knowledge of facts, rather than modeling the performance demands of everyday settings. The content of the test is kept secret from the student prior to the examination, whereas workplace performance presumes assessment of known and practiced activities. Rather than measure competence at what schools and textbooks define as important, cognitive science favors outcomes which

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[4] For a discussion of the enrollment patterns of community college students, see Cohen (1988) and Grubb (1989).

[5] In this research, the range of relevancy descriptors for general education from faculty and administrators ranged from "It aids you and benefits you," a locally understood colloquialism for "It makes you smart but you will probably never use it" to the formal statement by the University of Kentucky Community College system that "A general education core curriculum will ensure . . . graduates . . . who are well-educated men and women . . . this implies some understanding of the world of work and career fields." [N]

measure how well students can perform activities that have meaning in everyday social and occupational practice, and which are understood and credible to students, parents, employers, politicians, the media, and the larger community (Berryman & Bailey, 1992; Lave, 1988; Resnick, 1987).

There are, then, weaknesses to the use of gen ed requirements as an approach to the various competencies we have identified as important for career preparation. Instead of continuing to rely on conventional general education, the exemplary institutions we studied have devised other ways of incorporating these various domains into their entire curriculum. Among the most powerful of these approaches are the following:

Infusion

Infusion is the most pervasive approach to integrating academic and vocational education, in which independent technical or academic skills, modules, or applications are inserted into an existing course, reinforcing the significance of the added content and the original subject matter. Faculty members apply infusion when they briefly remediate a skill deficit, review a prerequisite skill prior to introducing a new concept, or explain the way in which a skill is used in everyday practice. Infusion may occur informally or formally, within a single course or as part of a cross-campus initiative. It can be bi-directional: that is, work-related applications can be added to academic courses, and academic concepts can be reinforced in occupational courses. Infusion is aided by the use of nonstandard materials such as popular, professional, or technical periodicals or texts, and by cross-teaching or grading, in which one instructor provides instruction or assesses student work initiated in another discipline.

Infusion retains standard disciplinary content, and can be implemented by an individual instructor with little or no cost. At the same time, infusion can be difficult to substantiate, given the freedom with which faculty operate their own classrooms.

Hybrid Courses

Hybrid courses blend career preparation domains and academic concepts within a single course, through the use of adapted content, materials, and added skills. Hybrid courses span a broad continuum from highly practical communication or calculation skill courses to more abstract occupational perspectives on the humanities, social, and natural

sciences. Grubb and Kraskouskas (1992) describe "applied academics" and "multidisciplinary" courses separately, but new forms of courses blur those distinctions, making it useful to consider any individual course which blends academic and career content as a hybrid course. These courses may be generic—of interest to many students—or career specific—tailored to certain career interests and needs.

Among the powerful advantages of hybrid courses are their adaptability and application of cognitive learning theory. Students duplicate workplace skills in their classroom assignments, learning by doing. However, hybrid courses tend to be over-reliant on the instructor who developed them. In several cases, we have learned of courses that had to be dropped because a particular instructor had left the campus. In addition, courses and curriculum do not guarantee an active learning environment for students; as we see in the next description, faculty remain the *sine qua non* of integrated learning.

Linked Clusters

In linked or clustered courses, students concurrently enroll in two or more classes which are united by a theme, occupational cluster, or developmental level. Joining courses offers a unique opportunity to meld a coherent sequence of learning activities and related assessment. Clusters are flexible by design, and can be scheduled so one instructor can trade class time with a teammate to complete activities that require additional time. The strongest clusters are organized by faculty who prize renewal and professional collaboration, regardless of the course content. Clusters rely on joint planning, making personal relationships a prime criteria for implementation.

Unfortunately, with both hybrid and clustered courses, innovative content and structure do not necessarily beget active teaching methods, and we have witnessed examples of didactic or unprepared instruction negating exemplary course outlines, learning materials, and linkages. Given the maturity of many of the nation's community college instructors, it may be unlikely that they will radically alter their teaching approach, course content, or professional arrangements with peers. At the same time, we have seen a number of exciting innovations created by instructors and administrators nearing retirement who

plan to "go out with a bang."[6] In any case, professional development for these approaches is imperative to facilitate teaching and learning success.

Authentic Assessment

Assessment is a continuing dilemma, as faculty struggle with how to measure student outcomes in ways that reflect performance as well as knowledge. Courses and projects in which evaluation is patterned after authentic work products is one response. Practice sets, applications, and classroom simulations offer demonstrations of competency similar to those used in everyday practice. One form of authentic assessment, the capstone project, culminates a program of study and draws together a multitude of communication, mathematical, technical, and productivity capabilities. Capstone projects are large, complex, work-similar activities in which students plan, execute, and evaluate an undertaking. They allow students to "know what they know," and create a valuable tool for conveying knowledge, skills, and abilities to potential employers.

Work-Based Learning

Work-based learning connects school learning with its application, at the same time it allows students a structured venue in which to practice generic technical and systems utilization domains. Although many colleges offer credits in work experience, work-based learning entails a connecting activity which links the school and job experience through discussion and assignments. However beneficial practical experience in the workplace is understood to be, most community colleges offer work-based learning to only a small fraction of their students.[7] To be sure, the School-to-Work Opportunities Act of 1994 provided federal funding for work-based learning and connecting activities; however, little of that funding—which was very little to start with—has made its way to community colleges. In general, work-based learning remains an attractive option for community colleges, though one that is so far quite limited.

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[6] We thank Kermit Bowling, Volunteer State Community College in Tennessee, for first bringing this phenomena to our attention.

[7] Less than one-fifth of occupational students take part in work-based learning, through cooperative education or internships, and an even smaller minority of transfer, liberal arts, and developmental level students do so. See Bragg and Hamm (1996) and Stern, Finkelstein, Stone, Latting, and Dornsife (1995). To our knowledge, only La Guardia Community College in New York, Cincinnati Technical College in Ohio, and the Ohio College of Applied Science have mandatory cooperative education for all majors. These programs are analyzed in Grubb, Dickinson, Giordano, and Kaplan (1992); Grubb, (1996b); Villanueve and Grubb (1995); and Grubb and Badway (1995).

The purpose of clarifying these approaches to providing various forms of instruction is to illustrate that community colleges and technical institutes are, potentially, highly flexible institutions. They can offer a *variety* of courses and programs, structured in a variety of ways, to meet the many different demands of workforce preparation. As we examine the specific practices of exemplary community colleges in the next chapters, we will see how these approaches can be used to create educational institutions that are flexible, innovative, and effective.

Directions for Using Volumes I and II

This Sourcebook is compiled in two volumes. Volume I presents a framework for identifying best practices of integrating career preparation into the community college curriculum—both content (Domains of Career Preparation) and strategies (Approaches to Teaching the Domains of Career Preparation). Volume II includes a number of illustrative examples of innovative curriculum materials and organizational arrangements that are in place at community colleges and technical institutes. The two volumes are cross-referenced, using the following notations:

- **[II-p.]** indicates the page in Volume II where a curriculum, structure, or professional development sample can be found.
- **[N]** indicates that a contact name is listed on pages 107-109 of Volume II, although the explanation in the monograph is probably self-explanatory and adequate for local adaptation.

For instance, on page 8 of Volume I, the faculty development model titled Educator-in-the-Workplace is mentioned, followed by the notation **[II–103, 105]**; for more information about that particular practice, the reader would turn to Volume II, pages 103 and 105. Conversely, on page 18 we describe an example of using literature to explore occupational dilemmas. Since the explanation is probably sufficient for the reader to understand and adapt to her or his own situation, there are no further materials provided, but the notation **[N]** indicates that a contact person is included on pages 107-109 of Volume II if the reader wishes more information.

CHAPTER 1
THE PROVISION OF FOUNDATION ACADEMICS

Because of complaints about basic academic skills from employers, and because occupations often require computation skills or writing and reading at advanced levels (to read complex manuals, for example), imparting foundation academic competencies has been an important component of revised career preparation programs. Most of the examples we provide in this Sourcebook provide ways of integrating these academic skills with occupational practices and perspectives.

In many community colleges, faculty and administrators are uneasy about combining transfer-level courses with career preparation; they often contend that transfer courses should be free of any specific context in order to "maintain the integrity of the discipline." As one college catalog states,

> General education is not specific application, techniques, or technology. General education is ideas, belief, knowledge, theories, skills and values, and thus transcends any single discipline, any single religion, or any single culture.

In addition, faculty point to the intransigence of transfer agreements as a constraint on adaptation, with the result that only 3% of those responding to our survey described incorporating career preparation into transfer-level courses. Conversely, several colleges have retained traditional course outcomes and, thus, articulation with four-year colleges while at the same time they adapt texts, learning activities, and student assessment methods in creative, hybrid courses. These rare instances offer examples of how such integration can take place, and clarify that such integration can uphold the academic level of such courses at the same time students are guided in connecting knowledge and its uses. The following examples demonstrate that rigor, integration, and application are not mutually exclusive.

Transfer-Level Integration of Academic Competencies

The examples reported of infusion in transfer level courses are quite different in motivation and ambition. Under a Tech Prep grant, the Business Division at Allan Hancock College in California identified management and economics themes in standard literary texts

and designed a series of suggested writing assignments. Several examples demonstrate the wide range of possibilities in applying an occupational lens to critiques of literature.

Sinclair Lewis' *Arrowsmith* lends itself to an analysis of management issues related to social responsibility. Students describe the role of interest rates and supply and demand on the agricultural family characters in Jane Smiley's *400 Acres* or trace modern business ethics to the writings in the Old Testament. Creative Writing students might write a story which presents ethical dilemmas, and students in a Study Skills course can use an article's context to define business and management terms. **[N]** These uses of literature to explore occupational dilemmas are quite similar to the development of hybrid courses for gen ed purposes, courses that we further describe in Chapter 6, "Incorporating Education for Citizenship: The Economic, Political, and Social Aspects of Work."

However creative these activities may be, they were not generated to meet an instructional dilemma widely identified by faculty, and have therefore been only sparsely implemented. Conversely, at Colby Community College in Kansas, occupational faculty identified a specific deficit in student preparation for a career and involved their academic counterparts in devising a solution. The faculty noted that "Even though students received instruction and practice in their Composition I classes—a required course for all business students—they were not transferring this know-how to other class situations" and were unable to write legal summaries or abstract analyses. A joint English-business faculty team planned a series of cross-teaching activities to help students transfer composition skills from an academic class (English Composition) to business applications. **[II–1-2]** In this case, the faculty were jointly motivated to remediate writing deficits, and cross-teaching has continued through other interdepartmental collaborations.

In other instances, colleges have infused writing into occupational courses; students gain practice in learning to write at the same time they use writing as a way to "think on paper" about the content of a discipline. Broome Community College in New York, Kapiolani Community College in Hawaii, and Prince George's Community College in Maryland offer occupationally related courses from which students may meet a writing-intensive course graduation requirement.[8] Writing-intensive occupational courses and

[8] At Broome, guidelines for writing intensive courses are elaborated in a faculty handbook, encouraging instructors to use a series of short assignments rather than one long one so that students can learn from their mistakes, try again, and improve. Each department is encouraged to create at least one "W" course so

linking literature or composition courses with occupational courses resolve the ever-present dilemma for English faculty to identify writing "prompts" or topics which are complex enough to elicit critical thinking yet are also engaging for students.

While many of the efforts to infuse academic competencies into occupational programs have been informal, several campuses have taken steps to formalize such efforts, especially in composition. The best-known of these is Writing Across the Curriculum (WAC), in which students write about content topics, and reinforce content knowledge through writing. Although several instructors reported the use of personal journals as a way to encourage student reflection and writing practice, in this survey we did not find the type of carefully considered writing-to-learn programs described in the literature. About 10% of colleges responding to our survey reported WAC, but very few colleges were able to offer course outlines, syllabi, sample assignments, or examinations demonstrating meaningful cross-curricular writing support. The most common approach has been the addition of one or more essay questions to a multiple-choice examination, or the assignment of a short paper with little accompanying instruction or composition criteria—approaches far short of the potential benefits from cross-curricular writing.

Hybrid Courses

Recently, some exciting forms of communications courses have appeared which explicitly blend transfer requirements with career perspectives, and demonstrate that transfer outcomes can be maintained when content and text adaptations are made. In these cases, the schedule of classes often designates these courses as "especially appropriate for" a particular group of students, although enrollment is never limited to only that group. For example, at Merritt Community College in California, an innovative instructor adapted an

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that students can meet gen ed requirements within their major. Broome students may meet the writing intensive graduation requirement by completing such courses as Nutrition, Dental Hygiene II, Developmental Psychology, Senior Physical Therapy Seminar, Special Radiographic Procedures, Material Testing for Civil Engineering, Advanced COBOL, Introduction to Small Computer Systems, Engineering Physics III, and Hospitality Law. [N] At Kapiolani, there is a thoughtful distinction between the various levels of Composition courses. The Business and Technical Writing courses are at the same level as English 100 (Expository Writing), but focus on *directed* rather than *expository and academic* writing, and satisfies a written communication requirement for the Associate of Science degree. Students may select from Business and Management Writing, Basic Nursing Concepts, Nursing Transitions, Introduction to Physical Therapy Assisting, Special Radiological Procedures, and Introduction to Juvenile Delinquency. [N] Prince George's students may select a second required English course from career-related alternatives which emphasize evidence-based analysis, evaluation, interpretation, and persuasive presentation of conclusions. Students generate a 500-word memorandum describing the operation of equipment or a technical process, including graphics. [N]

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English 1A class so that it was especially appropriate for health career majors, requiring expository, persuasive, and comparative writing assignments to analyze the moral, ethical, and economic issues related to the national health care reform proposals of 1994-1995. **[II–3-4]** Similarly, by modifying topics for written assignments and reading materials, the Volunteer State Community College in Tennessee developed three forms of the introductory transfer English course—rhetoric, literature, and workplace oriented. The Workplace Based English course features a number of ethical case studies such as The Case of the Willful Whistle-Blower, which students examine from several perspectives. **[II–5-6]**

At San Jacinto Community College in Texas, one literature course was revised to address the many students who doubt the practicality of the study of short stories, plays, and poems. Using two short stories by Faulkner ("Barn Burning" and "Rose for Emily"), the students write newspaper articles, use Internet research, and prepare public agency memoranda related to familial and community dysfunction described in the two stories. **[II–7-8]** Similarly, Broome Community College in New York offers a course called 20th Century American Working-Class Literature, which examines themes and structures of several genres written by authors from working-class backgrounds alongside the sociopolitical contexts of their works. Among the writing options in the course, students complete an oral history project about a retired worker, asking how work shaped his or her life, identity, and ability to act on the environment. **[II–9-10]**

Mt. Hood Community College in Oregon is developing an application-based, technology-supported, one-track curriculum (ATO) with the support of a National Science Foundation grant. In response to the demands of industry, the ATO curriculum integrates geometry, data analysis, and statistics in addition to algebra topics into entry-level mathematics. Incorporating the NCTM standards, the program encompasses analytic (algebra), visualization (geometry), and data analysis (statistics) skills with industry-related problem-solving activities interwoven. In the four-level curriculum, students work collaboratively to create their own understanding of mathematical concepts, make connections between different representations of mathematical models, and solve application problems which arise from other disciplines and the workplace. The five-credit courses involve four hours of lecture with a two hour hands-on lab component each week. **[N]**

Linked or Cluster Courses

Although a growing number of colleges offer thematically linked clusters or learning communities incorporating transfer-eligible liberal arts courses, only a few innovators have incorporated a career-related theme. Several colleges have done so by identifying content which has a natural connection—in which the skills from each content area complement one another. There are several examples of writing linked to both liberal arts and occupational courses at Solano Community College in California; one example connects electronic research and word processing in a duo titled Cruising the Information Highway: Composition and Computers. **[N]**

At Monroe Community College in New York, Money in Literature is linked with Business Administration. Students explore the human dimension of economic behavior, study society's formation of economic values, and discuss the economic aspects of individual lives. They identify the major "business deals" and strategies described in Clavell's *King Rat*, and compare the views of various authors towards the question "What is money?" **[II–11-12]**

Faculty who elected to work jointly at Peninsula Community College in Washington linked English with Criminal Justice. In this course, students describe the picture of a lawman represented by Heck Tate in *To Kill a Mockingbird*, and analyze the criminal justice system in the American South in the 1930s. Other research papers are linked to criminal justice, with sample topics such as of the changing role of women in high security institutions, and a critique of violence against women as both a cause and a result, based on Susan Glaspell's *Trifles*. **[II–13-14]** Another example of faculty seeking an avenue for collaboration is found at Montcalm Community College in Michigan, where English Composition and Introduction to Social Science are linked and targeted to Criminal Justice majors.

San Diego City College in California used technology as the theme for a cluster titled "History from a Workplace Perspective," which presented American History in light of technological breakthroughs and their impact on society, by joining U.S. History with introductory English. A third instructor from Computer Sciences added a lab component, so that students could practice keyboarding and software competencies while they wrote class assignments. **[N]** This and other clusters are offered under the umbrella of "Link and Learn in *City Blocks*—Where Courses Fit Together and Make Sense." These clusters are

publicized to help students "understand the course material; read and think critically by going beyond memorization of facts and figures; apply what you learn; bond with other students by spending 6 hours/week with them in class; and satisfy 5 or 6 units of gen ed requirements concurrently."

In one of the most ambitious efforts we have seen, Dutchess Community College in New York formed a 30-week, 32-unit integrated cluster which meets half of the requirements for an Associate degree. The cluster was initiated by requests from IBM seeking upgrade training for employees lacking prerequisite skills for learning to troubleshoot equipment and production failures, and is fully enrolled by working adults who meet twenty hours per week. The cluster combines English, calculus, economics, computer applications, physics, and chemistry, and uses work-related applications to the extent possible. The incentive for devising this particular arrangement was the negative feedback from previous contract education students about the lack of relevance in traditional physics classes. [N]

Although most colleges have reported positive faculty interaction from linked courses, another case suggests some caution about turf issues. A math instructor and a baccalaureate-level English instructor chose to link courses around a social issues theme, examining issues such as the high rates of incarceration of minority youth within the state. Students used statistics and readings from social journals and the popular press to argue viewpoints and write cogently about social dilemmas. But because the vocational faculty had not been involved in planning the courses, they successfully argued that the English and Math faculty were "stealing their issues," and the cluster has been dropped.

Another caveat comes from a college reporting difficulties when introductory and advanced level courses are linked. Not only was instruction complicated by students of varying preparation levels, but enrollment was sparse because most students in the advanced course had already completed the paired introductory courses.

Even though many academic faculty have been reluctant to modify transfer-level academic courses, enough colleges have experimented with this idea to prove that it can be done. There is nothing inherently "low-level" about the resulting fusion, hybrid courses, and clusters, and the results are ways of incorporating career preparation content into

transfer-oriented majors, so that *all* students benefit from learning that is connected to future goals and everyday interests.

Integrating Foundation Academics into Associate-Level Programs

In many occupational courses, the infusion of foundation academics at the Associate level is often informal—in fact it is usually unconscious. Infusion occurs in ad hoc ways, in short explanations to provide skill prerequisites for an occupational topic or to point out everyday applications of an academic subject. Examples of the former are a quick lesson in ratios for automotive students learning to calculate Ohm's law or in proportions when studying gas law influences in respiration. The instructor briefly demonstrates a specific concept and moves quickly to an occupational application. Conversely, academic instructors often signal students about the workplace uses of an abstract topic to reinforce its importance, using phrases like "you will see this again . . . ." Ad hoc lessons serve a limited purpose and are not intended to develop breadth or depth of the infused skill. Although this variant of infusion was not reported by a single college in the survey, conversations with faculty and classroom observations indicate that this approach accounts for much of what instructors refer to as the "natural integration" of academic and occupational education.[9]

Other examples of infusion are more purposeful, often using occupational content as writing topics. For instance, nursing students at Imperial Valley College in California follow writing guidelines for Patient Care Plans and clinical case studies. At Chattahoochee Technical Institute in Georgia, students write electronic lab reports which are graded by English faculty [N] and at George Wallace Community College in Alabama, students write auto manuals. [N]

Some colleges have published handbooks to provide instructors with sample applications or assignments. When a campuswide effort to infuse reading, writing, computing, speaking, and diversity was undertaken at the Community College of Denver, their Teaching and Learning Center compiled an *Integration of Critical Skills Handbook*,

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[9] We thank Dennis Atkinson, Automotive Instructor at Fresno City College in California, and Dr. H. Earl Roberts, Tech Prep Director at Delaware Technical and Community College, for helping us identify these informal practices.

describing examples of integrated applications at each of three increasing levels of proficiency. [N] An instructor at The State University of New York College of Technology at Delhi (a two-year institution) developed a *Snapshots: Math Applications* booklet, [N] and another at Ohlone College designed a *Language and Reading Skills Handbook* especially for occupational educators. [N] These and similar texts point out the difficulty many faculty expressed in finding published materials to assist in integrating career preparation into the general curriculum.

Institutional initiatives, in which cross-curricular teams of faculty design a collection of learning activities to infuse academic skills into occupational courses, spread benefits to large numbers of students. For example, at Fayetteville Technical Community College in North Carolina, four teams of six faculty initiated an experimental Quality Curriculum Integration Project, in which fifty curriculum integration activity guides were developed for 16 technical courses. The Math and Paralegal Studies faculty jointly developed a number of typical math problems found in the legal field, involving *pro rata* distribution of assets in bankruptcy cases, and fee calculations for real estate closing, contingency agreements, and consultation. Dental hygiene students write essays comparing diseases, following well-defined guidelines for content (disease etiology, symptoms, pathophysiology, treatment) as well as organization and mechanics. Teams of health careers students compare group writing after a video describing smoking cessation, so that students understand how personal bias may influence their ability to gain data from audio or visual material. **[II–15-16]**

At Mississippi Gulf Coast Community College, infusion is the avenue for cross-faculty implementation of career preparation. Each of nine teams of academic and technical faculty design two activities per semester, which are piloted and "tweaked" the next semester as the teams devise another pair of activities. The dean of the college is committed to faculty initiative, stating that "you can't go into a classroom and tell an instructor what to do. You can't mandate change, so we try to convince them [to change]." There is a willingness to experiment, as administrators and faculty consciously acknowledge that learning and modifications do not constitute mistakes. By accepting some risk and starting with a small group of volunteers, MGCCC is able to get new learning activities into the classroom in a short period of time. [N]

Even as some colleges move to add skills to existing courses, other colleges have "dis-embedded" academic skills, preferring to teach content in the more controlled environment of an independent course. Boise State College of Technology responded to a frequently cited call from accreditation boards and industry representatives for more academic content in applied courses and better basic skills from graduates. In response, the college brought together a joint curriculum review committee, which recommended a move away from academic skills embedded in technical courses and taught by vocational faculty, in favor of the development of applied courses which would meet academic and transfer requirements as well as industry needs. Because liberal arts instructors were so integral to the course development process, they have supported academic credit for the new applied courses which are described in the next section. Similarly, Durham Technical Community College in North Carolina identified the communication and computation skills common to technical areas, and devised separate courses to ensure those competencies were given greater attention.

Hybrid Courses

Hybrid courses at the Associate degree level are often referred to as "applied academics" because conventional academic competencies are meshed with work-related applications. Applied academics courses have evolved in response to a number of common challenges at community colleges. Boise State College of Technology in Idaho and Broome Community College in New York developed multiple applied courses to enhance student academic and employment success.[10] For similar reasons, Illinois Central Community College initiated eight applied academic courses this year, each jointly designed and taught by occupational and academic faculty. Although team teaching is a costly practice and may not continue after grant funds expire, the activities designed will continue to be useful.

A major strength of the new Technical Calculus course at Illinois Central is the addition of lab exercises for every topic, designed jointly by engineering/technology and math faculty. **[II–17-18]** The instructors noted the following:

> Several of the students have said that they do not really understand the topics until they see them used in the lab. In addition to helping in the

[10] The applied courses at these two colleges typify the variety of applied courses offered by community colleges. Boise State COT offers applied physics, mathematics, English, communication, Technical Writing and Mathematics, and Materials Science Lab. **[N]** Broome offers 23 sections of applied courses, including math, biology, earth science, chemistry, communication, and Principles of Technology. **[N]**

> comprehension of calculus, the labs also . . . help students gain experience in such areas as modeling a real system using mathematics, solving a problem in different ways to check for accuracy, and interpreting data and graphs. Recent studies indicate that these are the math skills that industry expects of Associate degree graduates.

In the new Business Communications course at Illinois Central College, students analyze an archival letter from a woman who worked as a "Rosie the Riveter" and petitioned President Truman to redress the unemployment of women and falling wages following World War II; they then conduct oral histories with senior citizens about their employment experiences after the war. In short written and oral reports, students convert statistics from business journals to charts or graphs and create colored overhead transparencies to accompany presentations. As a final evaluation of the course, students use standard memorandum format to describe ways they anticipate using the skills learned in the course. **[II–19-22]**

Other colleges have been motivated to offer a progression of applied courses as a way to ensure advanced competency. Believing that more conventional math is not necessarily better at imparting the skills needed by employers, Pulaski Technical College in Arkansas has designed two applied courses in Business Math, one of which is equivalent to Intermediate Algebra. **[N]** Other community colleges offer two or more levels of applied math or communications (Jefferson State, Alabama; Germanna, Virginia; Johnson County, Kansas; Washtenaw, Michigan; Broome, New York; and Del Mar, Texas). Based on employer input that traditional math did not equip students with the necessary technical or computational skills for productive employment, Peninsula Community College in Washington redesigned Technical Math, adding a substantial component of statistics and specific sections targeted to the skills required for careers in technology, health science, business, mechanics, fisheries, and engineering.

Another way to assure rigor is to cross instructors as well as content by having academic faculty teach occupational content. Mt. Holyoke Community College in Massachusetts and City College of San Francisco offer Nutrition and Food Safety courses through their microbiology or chemistry departments. **[II–23-24]** Introduction to Biochemistry of Food Science at Mt. Holyoke fulfills a one semester lab science for the Associate degree. **[II–25]** At Gateway Technical Community College in Connecticut, Environmental Regulations is offered by the chemistry department. It uses case studies

developed by instructors to help students connect political, economic, and chemical aspects of environmental regulation. **[II–26-29]**

Applied science courses may be targeted to specific careers, like the Biology for Health Careers course at Normandale Community College in Minnesota; Applied Physics for X-Ray Technology at Vista College in California; or Environmental Engineering, a chemistry-engineering combination at Mohegan Community College in Connecticut. Albuquerque Technical College in New Mexico introduced a Technical Writing for Environmental Sciences course because students were unable to meet national certification requirements for documenting hazardous materials management. Some courses are narrowly directed, with titles like Applied Math for Respiratory Technicians (Borough of Manhattan Community College in New York), Math for Science Technicians (Vista Community College in California), Pharmaceutical Math (Community College of Allegheny in Pennsylvania) and Math for Nursing (South Florida Community College). One technical math instructor noted,

> Technology students are very capable of learning math skills, but will only do so if they understand how they can make money with those math skills. They show very little interest in learning math for any beauty or logic that math may offer to others.

A special case of hybrid instruction exists at vocational training centers and technical institutes with a specific occupational focus. At these institutions, students enroll in a dedicated program of instruction, and foundation academic content is provided entirely within that context. At Alaska Vocational Technical Center, competency-based training programs include technical, generic, and academic skills in short-term "For Hire Education." For instance, Math for Baking, in which students learn to use and adjust bakery formulas and production tables, is an integral component of the Culinary Program rather than an independent math course. **[II–30-31]** At Alabama Aviation and Technical College, all gen ed courses are infused with aviation examples, so that students learn academic foundations and related industry applications simultaneously.

A few colleges reported eliminating applied courses in favor of infusion. Aims Community College in Colorado has moved towards substantial infusion of technical examples into Associate level courses. Tidewater Community College in Virginia favors infusion because applied courses are not accepted for transfer by four-year universities.

Clusters

Courses in Associate degree programs are often naturally linked. The Community College of Allegheny in Pennsylvania joins Medical Terminology with Anatomy and Physiology and Linn-Benton Community College in Oregon links Business Quantitative Methods with Technical Report Writing. Southeastern Community College in Iowa links Physical Science and Engineering Materials, and also Nursing with Psychology. Similarly, San Diego City College in California links Business Communication and Small Business Management so that students have time and the necessary expertise to produce professional business plans. Students apply communication skills as they analyze potential competitors, request demographic information and industry trends from a trade association, and document an interview with a small business owner. **[II–32-34]**

A second impetus for linked courses at the Associate level is to provide a context for academic concepts. At Vista Community College in California, the Communication Arts and Information Technologies cluster combines software applications with Computing-to-Write, Computing-to-Illustrate, Computing-to-Research, and Telecommunications and the Internet. Styles of writing are joined in a course with computer and visual design tools. Anecdotal reports indicate that by offering this cluster two evenings and Saturday each week, a cohort of individuals with previous negative academic experience has returned to college armed with skills and confidence. **[II–35]**

Macomb Community College in Michigan has clustered three courses, using a real-life automotive manufacturing problem for writing themes. In the Machining Cluster, one unit each of technology and business were linked with English Composition, a connection motivated by the tendency of technology students to postpone the required Composition class until the end of their college program, eliminating the benefits of writing proficiency throughout their coursework. Working as Human Resource, Training, Old Equipment Phase Out, and New Equipment Implementation Teams, the students designed a prototype plan for changing over to a new engine model in an automobile production plant. In addition to reading atypical texts, such as *Ford: The Men and the Machine* by Robert Lacey and *The Things They Carried* by Tom O'Brien, students wrote case studies to demonstrate solutions to manufacturing problems, applying the Theory of Constraints, decision trees, and industrial research techniques. **[II–36-37]**

Incorporating Foundation Academic Competencies into Developmental Programs

Perhaps the greatest challenge to implementing comprehensive career preparation occurs at the remedial or developmental level. Conventional assumptions have held that students cannot succeed in occupational activities until they have mastered an established level of communication skills—a premise *contrary* to contemporary research which holds that practical applications and problem-solving enhance the attainment of fundamental academic skills (Berryman & Bailey, 1992, Ch. 4). As a result, many students are routed to remedial or developmental courses, in which they practice basic academic skills absent a work-related context and without the relationship between remedial education and their occupational goals ever being clear to them. Large numbers of students drop out of remedial courses and so find their ways to economic advancement blocked. The same is true for English as a Second Language (ESL) instruction, and the approaches for remediation and ESL are very similar, though of course remedial efforts target English-speaking students while ESL concentrate on the special problems of immigrant students needing to learn English as well as the customs of this country.

A powerful alternative has been to infuse the teaching of remedial subjects with occupational or everyday applications. The faculty at Cape Cod Community College in Massachusetts recognized the advantages of infusing practical uses into developmental level math. **[II–38-39]** In a module designed to answer the question, "When will I ever use algebra in real life?," students use examples from the popular press to write equations representing drinks per hour and blood alcohol levels; predict foreign holdings of U.S. Treasury bills; project future generating capacity of local power plants; and analyze the validity of various math approaches to address political, social, and business situations.

Hybrid Courses

One way to provide remediation in occupational coursework is through occupationally related math or reading courses, or ESL courses with occupational content (often called Vocational English as a Second Language, or VESL). Orange Coast Community College in California began with one VESL course and then expanded into other occupational areas. As is typical of urban colleges with a large enrollment of new immigrants, demand for ESL instruction far outpaced available space and waiting lists were often more than a year long. Unable to enroll in language courses, students pursued

occupational preparation without a foundation in English reading or writing skills. In addition to delayed enrollment, the faculty was concerned about the inability of students to transfer their new language skills to settings outside the ESL lab. A local anecdote about an ESL completer who enrolled in a health careers course, and who understood the meaning of the color "blue" and the noun "code" but could not make sense of the emergency notice of "code blue," is poignant testimony to the challenges of moving limited English proficient (LEP) individuals into employment.[11] At the same college, the machine technology faculty noted that LEP students were achieving technical competence quite rapidly, but lacked workplace communication and technical reading skills. Using vocational education funds, an ESL and a machine technology instructor collaborated on the development of a VESL course, beginning with the language instructor's enrollment in the machining course to become acquainted with specific terminology and concepts. Based on the success of the VESL-Machine Technology course, the college spent $40,000 to develop and implement VESL for Health Occupations, Computer Information Systems, and Airline Travel Careers. Orange Coast faculty note that by offering language acquisition skills in an occupational context, students are able to move to certificate and degree sequences more rapidly, and are able to appraise their progress in terms of an employable future. **[N]**

San Francisco City College offers Successful Communication in Health Occupations, an introduction to medical terminology for LEP students. A similar course, English for Automotive Technicians, is a bridge course between basic ESL and the automotive program, preparatory to a student meeting the language requirement for occupational courses in automotive technology. The course focuses on terminology, and is jointly taught by occupational and ESL faculty. **[II–40-41]** In addition, San Francisco City College offers VESL for Hospitality and Office Careers.

A novel twist to ESL courses are the "reverse-ESL" courses found at Monterey Peninsula College in California, **[N]** Dona Ana College in New Mexico, **[N]** and Southern Arkansas University-Tech. **[N]** In these courses, foreign-language competency is enhanced so students can use professional idioms and technical terminology to communicate with patients, customers, and clients in a non-English language.

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[11] Our thanks to Dr. Pat Stanley, Dean of Occupational Education, Orange Coast Community College for this story.

At Las Positas Community College in California, the auto technology instructor noted that poor skills prevented some students from reading technical manuals or passing industry certification, making them less able to obtain employment and stay abreast of changes in the field. An English instructor, formerly a personnel trainer at Isuzu Motors, combined developmental language instruction and career preparation by using high-interest text from automotive magazines, service manuals, certification brochures, and bulletins; students write paragraphs of at least five sentences, practice clear penmanship, interpret referents of pronouns, interpret poetry about automobiles, and find information in advertising publications. The course is coded as an automotive course and taught by a blue-jeans-clad English instructor in the auto shop. Based on the improvement in student reading performance as a result of the course, the college has added it as a requirement for all auto programs. **[II–42-43]**

Southern Arkansas University-Tech (the community college branch) offers Introduction to Electronics, Methods of Electronics, Applied Electronics, Basic Blueprint Reading, and Introduction to Industrial Technology as one- and two-credit courses with no prerequisites so that students can practice elementary reading and math skills in career studies related to their interests. **[N]** Santa Fe Community College in New Mexico offers applied academic courses at the developmental level primarily for vocational students. At Vermont Technical College, a single developmental course intertwines algebra, geometry, and trigonometry with Newtonian physics, kinetics, energy, and momentum so that students attain the math prerequisites for physics and have physics applications for math. **[N]**

Linked Courses

Some colleges have linked a developmental and a collegiate course as a kind of tutoring mechanism, intended to expand opportunities for practicing reading comprehension. At University Community College in Ohio, "compensatory education" is viewed as a delivery system rather than a particular course level. Transfer courses are paired with compensatory reading courses to assist in understanding vocabulary and content of texts and lectures. The rigor of the transfer-level course is maintained, while students receive the extra assistance they need to succeed in the course—especially helpful to re-entry adults and low-achieving students. The compensatory course is non-credit, but

this approach allows students with marginal skills to successfully complete transfer level work. **[N]**

At West Valley Community College in California, fashion design courses consistently include a group of LEP students seeking employment in regional apparel markets. Because completion rates for this cohort were low due to language problems, the department chair initiated a pilot project for ten LEP students, linking the occupational course with an ESL lab in which fashion terminology was audio-recorded. With the assistance of the ESL staff, the fashion instructor developed informal lecture outlines for the identified students, which also served as study guides during ESL resource sessions. By midterm, the entire class, including native speakers, was using the study guides and terminology tapes as instructional aids. Retention and achievement rates improved significantly over previous semesters, and the instructor noted that the class formed cross-cultural study groups—a new phenomena for that department. The success of the pilot project was the springboard for departmental discussions about teaching approaches, resulting in greater attention to guided instruction for all students in the department. **[II-44-45]**

Several colleges, including Lake Sumter in Florida, Northland Community College in Minnesota, and Lake Tahoe Community College in California, found that linking developmental English and computer courses enhanced performance levels. However, among other colleges, a computer-language linkage tended to be relatively mechanical—a technical tool to practice "skills and drills" in an environment short on personal interaction.

More complex forms of linked courses, or developmental education learning communities, have also emerged as a "bridge" between remedial education and the students' pursuit of career goals. Because the attrition rate was so high among students enrolled in ESL courses, a college administrator at Mass Bay Community College in Massachusetts was concerned that LEP students lacked hope of achieving career goals. To address the lack of opportunity for these students, an occupationally related cluster was formed which joined the upper two levels of ESL with Associate level study in "Contemporary Economics" as well as "Introduction to Business," a new career survey course for undecided students, returning adults who needed gradual and successful introduction to college terminology and demands, and students lacking firm language capability. The cluster did not require concurrent enrollment, although ESL advisors

strongly recommended it to transitional students, and about 85% of the students enrolled in all three courses. The cluster altered conventional course enrollment patterns, since students who completed the cluster had met both a social science requirement (Economics) and a business elective (Introduction to Business), decreasing potential numbers in other similar courses. Faculty are invited, but not required, to teach in the cluster, which balances joint planning responsibilities with the assurance of full enrollment. **[N]**

Indian River Community College in Florida is in its third year of an integrated Bridge Program which combines sixteen credits of non-credit courses (Applied English and Math) and credit-bearing courses (Applied Physics, Applied Philosophy, and Principles of Academic Success). In addition to that core, students select a Business or an Industrial Technology Introduction. Teamwork and work-like projects are emphasized within an interdisciplinary context in which students discuss the historical and technological perspectives of either a Business or a Technology operation and practice technical skills used in a variety of careers within their chosen cluster. All of the instructors in this cluster have taken a uniquely thoughtful approach to feature activities which integrate academic and practical content. **[II–46-48]** The philosophy professor explains:

> My motivation for developing such a course came from the realization, after many years of teaching critical thinking, that conventional methods and subject matter (including emphasis on deductive logic) only benefit a small percentage of students. On the other hand, the present material is internalized and effectively utilized by virtually all students, including those in need of remediation. As one student put it, "This stuff is better than logic." If it tasted like "logic," I doubt it would go down as easily. In my system, the technical terminology of logic has been fully translated into non-technical language.[12]

Two colleges adopted clusters of courses and skills which included classroom and work-based experiences for pre-college level students. Faculty at Penn Valley Community College in Missouri noted that re-entry, disadvantaged applicants were not successful in gaining admission to the licensed practical nursing (LPN) program, even though some had earned certified nursing assistant or certified medical technician licenses. Those who entered the program often failed due to academic or personal problems. To boost admittance and retention for high-risk candidates, the college joined with the state welfare-to-work program and the local Private Industry Council to design a transition pre-LPN program. The program has an academic component which meets 32 hours per week for 13

[12] For a further description of the Applied Philosophy course, see Cohen (1996).

weeks and includes remedial academic skills and a host of support services. The clinical component prepares students to take the state exam for several paraprofessional licenses, as well as the entry exam for the LPN diploma. The program regards participants as complex adults with multiple but not insurmountable barriers to learning, and boasts a Bridge completion rate of over 80%, with 75% of those finishing the LPN program. The cost per participant is about three times regular tuition costs, including counseling and tutoring services, a dedicated computer lab, texts, and supplies. **[II–49-50]**

For the past two years, Mt. San Antonio Community College in California has offered a unique alternative path for students who, because of their limited English, are not qualified to enroll in occupational courses at the college. Those students were enrolled in adult education courses in word processing and business vocabulary, which parallel the content of credit courses at the college. Concurrently, at the college, the students registered for a non-credit course in Advanced English as a Second Language, and were placed in internships which allow them to practice skills from the three classes. At the end of the semester, students apply for credit by examination for the two business courses, and about 75% have been successful each semester. The struggle for the students to achieve the course requirements has been great, but if the students enroll for Associate credit status they will have already earned six units, and moved toward career goals in the process. **[N]**

The examples in this chapter illustrate the varied and flexible ways of incorporating foundation academic competencies into occupational programs. Such efforts can take on any scale, from relatively quick and informal efforts at infusion to college-wide programs of applied academics courses, Writing Across the Curriculum, and linked courses. They can be developed for any level—for transfer-oriented occupational majors and Associate degree occupational programs, as well as for the developmental and ESL education that has become such a necessary part of most community colleges and technical institutes. The extent of faculty collaboration varies as well, with some efforts relying on occupational instructors alone, while others depend on co-teaching among several academic and occupational instructors. But any of them can help provide academic competencies to move all students towards career goals.

CHAPTER 2
TEACHING GENERIC TECHNICAL SKILLS

Generic technical skills are universal in technical and professional employment, providing the tools for line staff and managers to diagnose and improve systems of production and operation within an organization. Their diversity allows for various forms of integration into community college courses and degrees, at various levels of complexity. Although most colleges impart generic technical skills in isolation, separate from their utility in identifying and solving problems, a few colleges make them an integral part of sophisticated simulations or culminating projects.

Infused activities and stand-alone courses account for most instruction in generic technical skills. In programs intended for transfer students, several colleges infuse word processing skills into written communications courses. For instance, Merritt and San Diego City Colleges in California have several sections of English Composition which are Macintosh-based, and at San Jose City in California and Oakton College in Illinois, keyboarding and common software are infused into marketing courses. At San Jacinto Community College in Texas, students in literature classes write newspaper articles about characters in short stories, using the newspaper template in popular word processing software, and research information about social conditions in the stories via the Internet. **[II–7-8]** Monroe Community College in New York offers three versions of computer courses—practical, mathematical, and technical. Kennedy-King College in Illinois offers Microcomputer Usage for Nursing. To achieve the same goals, some colleges—including Pulaski Technical College in Arkansas, Colorado Mountain College, the Community College of Philadelphia, Prince George's Community College in Maryland, and Hudson County Community College in New Jersey—require a stand alone computer or keyboarding course for graduation.

The skills of preparing and analyzing graphic displays of data can be naturally infused into occupational courses. Nursing students at Cape Cod Community College in Massachusetts use criterion-based decisionmaking and modified Harvard Case Studies to evaluate hypothetical nursing situations. **[II–51-52]** At Fayetteville Technical College in Arkansas, students use flow charts to show the decisionmaking process in dental treatments, and accounting students depict effective accountant competencies using a network tree.

Occupational safety, another common technical skill, is a stand-alone course at Guilford Technical Community College in North Carolina, the Community College of Allegheny County in Pennsylvania, and Monroe Community College in New York. Other colleges require first aid or CPR in certificate programs. Guilford [N] also requires a course in Small Business Operations for several technical diplomas, universal knowledge for graduates wanting to become employed in or open their own small enterprises. At Washtenaw Community College in Wisconsin, students who complete and pass exams for Food Service Management earn certificates in CPR and Techniques of Alcohol Management (TAM), generic requirements in the food service industry. [N]

Quality management techniques are included as both content and pedagogy in the technical programs at two colleges surveyed. In some courses in the Quality Management program at Elizabethtown Community College in Kentucky, student teams help design the course syllabus, determining academic and attendance expectations. Because students often cannot decide on absolute attendance policy, the classes typically agree that group approval for excused absences is required. Faculty at Elizabethtown note that the interpersonal responses of teammates serve as a better behavior control mechanism than faculty-made regulations. In this way, students gain practical experience in team decisionmaking and implementation strategies common to high performance workplaces. [N]

In another application of quality control techniques, students calculate the mean of test scores, and students who score above or below one standard deviation from the mean write a short essay on why they did (or did not) do well on the test. Without student names, the essays are distributed to the class for students to compare successful and unsuccessful production (test preparation) strategies.

Among other Total Quality Management courses at Scottsdale Community College in Arizona, students can enroll in classes which teach, apply, and practice Quality Customer Service, Writing for Quality Results, and Leadership for Front Line Employees.

The universality of generic technical skills is demonstrated by the difficulty they have in locating a "home" department. As one Department Chair noted in relation to offering generic business and quality control procedures,

> One of our problems in the community college is that everyone says you're in this or that. Wait a minute! We're all in business. Business is not a

> department, it's part of every job. Academic faculty look down on business courses because they aren't intellectual enough. But really, business is a generic term.

As an illustration of this view, the manufacturing department at Butte Community College in California noted the need for high-performance workplace training for technical students, and designed a new course for approval by the curriculum committee. The Business Department argued that the new course content was similar to that included in current business courses, and that HPW techniques should be offered to a broad group of students. The Business Department was successful in redesigning a business course to meet manufacturing standards and avoided a new and competing manufacturing course being initiated. **[N]**

However, at the developmental level, generic technical skills are almost entirely absent. A unique example of the usage of these skills as tools for completing tasks and following the flow of work through a system is found at the New Hampshire Technical Institute's (Laconia) program for incarcerated adult men and women. The Management with Computers course employs an information management simulation in which students complete increasingly difficult projects such as composing memos, designing publicity materials, creating and merging customer database records, and designing spreadsheets and related graphs to project sales. The excitement in this classroom was palpable, as adults who had previously experienced school failure were able to gain computer application skills in a work-related simulation. Administrators report that students simultaneously improve in foundation academic skills, and that completers of this and other courses have significantly lower recidivism and higher average pay rates compared to similar groups that have been returned to their communities. **[II–53-54]**

These examples illustrate that the integration of common technical skills can be incorporated into academic and occupational courses with positive effect, and that when generic technical skills are used to complete interesting, real-life projects, they foster positive outcomes for students and for institutions.

CHAPTER 3
INTRODUCING SYSTEMS UTILIZATION SKILLS

Over the past decade, several political, social, and economic forces have highlighted the importance of the competencies we describe as systems utilization skills. The skills allow individuals to understand and utilize resources (diverse personnel, time, capital, material, and facilities) to shape organizational performance. In some cases, colleges have emphasized personnel resources, as concerns about affirmative action and about the racial, ethnic, and gender diversity of the labor force have highlighted the interpersonal element necessary for effective workplaces. In turn, these concerns have led to the development of various kinds of human relations courses.

A few colleges have adopted a specific cultural diversity graduation requirement. Intercultural Communication, a speech course, fulfills the diversity requirement at Prince George's Community College in Maryland and San Diego City College, as does a course in ethnic, women's, or gay and lesbian studies at San Francisco City College. The Community College of Denver developed a faculty guide for infusing cultural diversity discussions at three progressively sophisticated levels into any course. **[N]**

Interpersonal skills are addressed frequently at the Associate level as units within occupational, psychology, or applied communication courses that focus on intra- and interpersonal skills necessary for group interaction. Some colleges offer stand-alone Human Resource courses to meet state requirements (Eastern Idaho Technical College; Helena Vo Tech Center in Montana; and University of North Dakota Community College), similar to locally developed requirements at Vance-Greenville Community College in North Carolina and Ogeechee Technical College in Georgia. Yakima Community College in Washington requires Human Relations in the Workplace for all students enrolled in an occupational/technical program that does not include a unit about employee interaction. Other community colleges offer elective courses with titles like Group Process (Stark Technical College in Ohio), Interpersonal Effectiveness (Monroe Community College in New York) and Individual and Group Behavior in Organizations (Moorpark College in California). At Southwestern Technical College in Minnesota, the Worker Effectiveness Training course builds on the rich working experiences that participants bring to the class through a variety of adult learning activities and workplace applications. The course

focuses on individual development of the worker, interpersonal development for team membership, and career planning and development.

Colleges with divisions of International Business (Butler County Community College in Kansas **[II–55-56]**; Scottsdale Community College in Arizona; Dona Ana Community College in New Mexico; and Los Angeles Trade Technical College) offer an applied strain of cultural diversity, emphasizing the impact of geography, history, religion, politics, education, and customers on international communication and trade policies.

Other colleges have focused on a broader set of competencies, imparting skills in utilizing multiple resources to plan and implement substantial projects so that students gain a personal understanding of interdependence across divisions of the organization. A related taxonomy of skills that high-performance workplaces seek in employees has been published by the Secretary's Commission on Achieving Necessary Skills (SCANS) of the U.S. Department of Labor, which has led to initiatives that vary widely in scope, ambition, and outcomes. SCANS introduced an extensive set of skills into the national vocabulary of workplace requirements, including interpersonal relationships but incorporating other competencies as well, and nearly one-fifth of the campuses in our survey and even more individual certificate and degree programs have undertaken initiatives to integrate SCANS skills. Meeting SCANS competencies has clearly become the curricular reform *de rigueur*, even though the scope and outcomes of these initiatives vary widely. Some colleges have adopted the SCANS taxonomy *in toto* (Imperial Valley Community College in California; Pikes Peak Community College in Colorado; Richland Community College in Illinois; and El Paso Community College in Texas), while others have advanced a locally developed set of core competencies.

As part of the process to guide New Hampshire Technical Colleges in their transformation to comprehensive colleges, a statewide group of faculty, administrators, and business representatives used a DACUM-like process to establish core competencies; course outlines now denote direct or indirect instruction for each skill within every college course. **[II–57-59]** At San Jacinto Community College in Texas a directive from the State Coordinating Board to integrate the SCANS skills meshed nicely with the campus effort to implement a locally devised set of Student Learning Outcomes (SLOs), which included SCANS skills as well as technical and career-specific outcomes. The SLOs were identified by division deans, with individual faculty developing classroom learning activities. One

administrator described the process as "a lot of little pieces coming together to make a climate for learning," as faculty moved beyond fear of encroaching into another territory and towards an organizational culture in which learning and assessment discussions flow more freely. **[N]**

Similarly, Waukesha County Technical College in Wisconsin has had 21 Critical Life Skills in place for a decade, which are introduced in gen ed courses and reinforced and applied through occupational study. (For a broader description of Waukesha Critical Life Skills, see ERIC Document Reproduction Service No. ED 330 386.)

Following a yearlong process in which a cross-institutional group of faculty identified 24 core elements, inclusive of work-related and academic skills, instructors at Washtenaw Community College in Michigan now determine which core competencies they wish to meet, provided each academic and occupational program meets all elements. The college catalog lists the core elements met by each course, and students make enrollment selections based on competencies rather than a distribution of gen ed and major requirements. Students review their progress towards completion via an on-line "audit" system of their transcript. **[II–60]**

But even with such laborious undertakings, instructors and administrators express concerns about measuring SCANS or core competencies. Colleges sometimes use lengthy checklists or written descriptions of skills addressed in a particular course, with little substantiation.[13] Because SCANS or core skills are often infused into existing occupational and academic coursework, their effectiveness often depends on instructor commitment—a difficult factor to evaluate. One division dean noted that "curriculum drives instructional and pedagogical change," suggesting that changing course assignments and activities is the most efficient means in modifying instructor behavior towards performance outcomes.

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[13] Assessing SCANS skills has been troublesome. We have seen elaborate matrices cross-referencing SCANS skills with courses within a particular program, with no evidence that the skill is being imparted or mastered in a meaningful way or in an everyday context, as advocated by the SCANS document. Three colleges in our sample appeared to be wrestling seriously with this challenge. El Paso Community College in Texas uses a designated form to describe learning activities which integrate SCANS skills. **[N]** Richland Community College in Illinois **[N]** and San Jacinto Community College in Texas **[N]** attempt to measure SCANS competencies through descriptions of activities and testing. See also Shepherd and Morgan (1996) for efforts at Richland.

To guide faculty and students in measuring productivity competencies—of moving from "knowing" to "doing"—a few colleges have adopted workplace simulations within the school environment, or have designed culminating or capstone projects that unite academic and technical skills to complete a work-similar plan, proposal, or product.

Simulations—in which an instructor attempts to reproduce the physical setting, interaction, work products, and technical skills required in the workplace—are ways to assist students in moving from classroom-based knowledge to practical performance. At the College of DuPage in Illinois, an elaborate Business Simulation Project simultaneously teaches seven business, management, and marketing courses, with students in each course forming that particular department in a hypothetical firm. The simulation provides a framework for students to understand the flow of work among departments and the underlying system of work production. Interpersonal communication occurs within and among departments, and between managers and line workers. Students collaborate in teams, as the Production students explain their job well enough to the Human Resources students that Human Resources can prepare an evaluation instrument for the Production Department. Students apply industry approved software packages to improve productivity and product marketability. The simulation is cost-effective, in that enrollment in each course is typically six to eight students, but the simulation can be offered even if a course has an enrollment of only one. **[II–61-63]**

At George Wallace Community College in Alabama, on-the-job conditions are simulated in the lab and with actual work projects. Electrical students are given a house that has been constructed in the lab to complete the wiring. The project is tested with live power and inspected by local building officials to ensure all electrical codes are met. Masonry/Building Construction students, under supervision of the instructor, have constructed several storage buildings on campus. Auto Mechanics and Auto Body Repair students are given printed work orders to complete repairs that meet quality and time specifications designated by the industry. The instructor also uses industry standards for evaluation of students' work. **[N]**

The same college finds that state and national competitions sponsored by student vocational organizations offer realistic performance opportunities for some community college students. However, the constraints of time and non-school responsibilities reduce

the availability of this experience for many students, and competitions typically focus on a limited number of skills.

Capstone projects are another way to integrate academic and technical skills. A capstone project is generally the final demonstration of a student's knowledge and performance ability, as measured by the planning, execution, and presentation of a work-like product. At Columbus State Community College in Ohio, for example, students in Microcomputer Technology work in small groups to evaluate appropriate hardware and software for a start-up small business system, and design and develop the appropriate forms, presentations, data entry, and retrieval procedures that such a firm would require. To complete the project, students must conduct interviews of internal and external parties to gain information; evaluate the purposes and alternative forms of management reports; develop complete simulations of the database, spreadsheet, and other functional systems; and make a class presentation using transparencies, graphs, and charts. **[II–64-65]** At the same college, students in Construction Management track a building project through start-up, control assignments, control structures, organizational forms, subcontractor and vendor management, and move-out phases, using a computer simulation of project management activities and processes. **[II–65-67]**

The Industrial Technology students of Sinclair Community College in Ohio work in teams to design a factory with the capacity to machine a total of 504,000 wheel cylinders per year to required specifications. The final project includes a written report supplying a layout drawing of the plant site; a description of the material handling system and its method of operation; cost projections for the next decade; calculations or direct and indirect labor costs per shift and per year; annual salaried labor projections; estimated total direct material costs for finished goods and scrap; a list of production machinery and cost projections for salaried and hourly labor, production machinery, scrap, freight, equipment installation, production and quality control instruments, site development, and other overhead costs; flow diagrams of processes, and factory layout; and a calculated costs per completed part. At the end of the semester, students simulate an engineering report to a Board of Directors of a manufacturing firm. The only grades assigned are A, B, and F. **[II–68-70]**

To culminate a series of conventional, independent courses in electronics, semiconductors, and operational amplifiers, San Diego City College offers a two-course

capstone sequence. The courses are offered only in the evenings to allow students contact with an adjunct instructor who is an engineering director for a leading electronics design and manufacturing firm. Students are organized into small engineering design teams to design a microcomputer controller for a device to track the sun across the sky. Each team submits for guidance and consultation a timeline for constructing, testing, and presenting the prototype design, including initial design draft, final design, component vendors, prototype assembly, and final testing dates and then uses designing software to generate a schematic diagram. Once the unit is completed, the instructor inserts faults to sharpen the students' troubleshooting skills. The department chair notes that the capstone courses attract four-year engineering graduates whose training has emphasized theory and who seek practical experience in their field. The courses are also cost-effective in that students build components that are expensive to purchase in a completed form, thereby gaining a greater appreciation for complexity and its costs. **[II–71-72]**

As in the case of other competencies, then, there are numerous ways to introduce system utilization skills into any course; but simulations and capstone courses offer an approach which integrates most of the career preparation domains identified in this monograph into a substantial project, validating a student's postsecondary education to potential employers.

CHAPTER 4
WORKPLACE ORGANIZATION EXPERIENCE

Regardless of how similar to the workplace a project or simulation is, the pace and multi-tasking of the work environment cannot be duplicated within a classroom setting. For this reason, recent federal reforms such as the School-to-Work Opportunities Act of 1994 recommend that programs incorporate both school- and work-based learning, along with activities which connect the two. As we described earlier, community colleges offer limited work-based learning, such as internships or cooperative education, for students in technical fields, and most lack any work-based opportunities for liberal arts students. In addition, examples of activities which link work-based education with academic experiences are almost non-existent. Even when survey respondents or college catalogues describe seminars designed to integrate classroom and work-based learning, the actual activities within the seminar are usually limited to job-getting and -leaving strategies.[14]

An exception is the mandatory cooperative education program at La Guardia Community College in New York, where enrollment in three 12-week co-op placements is mandatory. Placements vary from 15 to 40 hours per week depending on the needs of the internship agency and the student's schedule. Coupled with each internship experience is a seminar, which connects particular coursework with practical application (Grubb & Badway, 1995). Students in programs with regulated internships (i.e., in health care) and evening students who presumably have jobs are exempted.

The first seminar, Co-op Prep, is completed prior to attendance at a co-op placement. Similar to co-op seminars elsewhere, this course is intended to teach students how to apply for jobs, how to present themselves in interviews, the norms of workplaces, and other skills related to gaining employment. However, because of the mandatory co-op placement, the relevance of résumés, applications, and interviewing is immediate as students begin to apply for co-op placements. Following the introductory Co-op Prep, three separate placements and seminars complement one another, with students assuming

[14] Several colleges identified work experience or cooperative education seminars as an example of integration reforms, and a number of catalogs list such a course; some described the course content to include topics like work ethics, career exploration, or work adjustment. But when we spoke with faculty or students enrolled in those courses, invariably the curriculum was limited to résumés, applications, interviewing, and weekly reports of hours worked; rarely was a greater understanding of work organization and behavior engendered.

the role of "participant observer" in analyzing the structure of the organization and the behavior of its members.

In the second seminar, titled Understanding Critical Issues at Work, students apply theoretical concepts such as corporate culture, organizational schema, leadership styles, and corporate ethics. Field assignments direct students to analyze the placement site for teamwork, indicators of power and authority, corporate values, and ethical dilemmas. Fundamentals of Career Advancement, the third seminar, focuses on career challenges, formal and informal lifetime learning, career information sources, and the use of personal and professional networks. Students learn to identify and practice strategies for upward mobility used by successful executives such as seeking difficult assignments, coping with hardships, observing key people, and getting feedback on areas of strength and weakness. The final seminar focuses on career-specific applications of classroom knowledge. For instance, accounting students follow detailed directions for analyzing systems of information flow at the work site, while food service management students critique and design systems for personnel selection and supervision. Liberal arts students complete activities related to social services **[II–73-75]** or the effects of technology on modern society.[15]

A second semester Composition course links internship or capstone experiences at Southeastern Community College in Iowa, so that students use the design of projects and an understanding of the work organization as the context for writing. **[I–76-77]**

At the developmental level, few students have the opportunity for work-based learning. Only two colleges reported internships for developmental students—Penn Valley in Missouri **[N]** and Mt. San Antonio in California, **[N]** both described in Chapter 1. In both cases, courses were clustered to provide an occupational context for basic skills. These two programs were initiated through joint planning between several divisions of the college to overcome the long spells of remediation before students can meet career goals. In these unique programs, LEP students improved their proficiency at the same time that they were engaged in occupational and/or academic study.

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[15] The four co-op seminars are directed by faculty written texts, which are variously generic to workplace analysis and specific to career majors. Text titles include *Understanding Critical Issues at Work* by Paul Saladino and *Fundamentals of Career Advancement* by Diane Ducat, **[N]** as well as a variety of occupationally specific texts for the final placement experience.

Programs which connect work-based experiences with academic and/or occupational preparation parlay the potential learning possibilities through the timely application of theory as students learn and use knowledge related to their career goals.

CHAPTER 5
CAREER EXPLORATION

Despite the large number of "experimenters" in community colleges, unsure of their career goals, the provision of services intended to help students evaluate their career options is limited in most community colleges. While many students report being helped by guidance and counseling services, the most uncertain students may never find their way to student services because they are unsure even of what questions to ask.[16] Although students often tour the career centers as part of the college orientation program, few take full advantage of such facilities. In addition, there are distinct disadvantages to separating counseling from coursework—particularly for occupational programs because of the long history of counselors steering students away from occupational programs.[17] In this section, we examine the efforts to address career exploration within the context of the community college.

The provision of guidance and counseling within coursework is not common: only 5% of colleges in our survey noted explicit career exploration and decisionmaking components within the academic and occupational curriculum. At the transfer level, specific career requirements are often naturally infused into introductory academic or occupational courses. For example, in an Introduction to Psychology course, a chapter or a series of vignettes describes career options, educational requirements, employer and workplace characteristics, and future demand for positions related to that discipline. Accounting students at Fayetteville Community College prepare a schematic network tree illustrating the personal traits, competencies, and related college courses necessary for employment in the field. At other colleges, speakers, field trips, and interviews blend career exploration with coursework.

At Santa Barbara Community College in California, a Career Research Project has led to several faculty developing research assignments to encourage students to take full

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[16] See the description of the "triage" outcome among California community college students described in Grubb (1996b), Chapter 4: those students most sure of their career goals tended not to use counselors, and those who were the most unsure also failed to use counselors because they did not know what to ask. Those in the middle reported counselors helpful in identifying program and transfer requirements and helping them develop course schedules and timelines.

[17] For this reason, some exemplary programs intended to enhance the advancement of minority services have integrated the efforts of counselors and instructors, especially Project Bridge at Laney College in California.

advantage of Career Center resources. In these, students summarize key points from video and computer information about career requirements and transfer programs in their major field of interest. Students reported that they became familiar with Career Center resources and clarified their career and educational goals at the same time they applied a wide range of research skills to these assignments. **[II–78-79]**

At the Associate level, some hybrid courses combine general and career specific exploration. A number of colleges offer counseling courses to provide group opportunities for self-assessment, coupled with assignments designed to identify personal interests, abilities, values, and experiences as a basis for generating career alternatives. At the Community College of Philadelphia, Life Planning and Career Decision-Making presents a decisionmaking model for vocational selection and life planning, using a multimedia approach to gathering information about the world of work.

Other hybrid courses explore specific career clusters. Survey of Health Occupations at Los Angeles Trade Technical College is a modularized course required for entry into Nursing and Health Occupations programs. The course covers opportunities in health careers, transfer credit, and individual learning styles. Survey of Electronics and Computer Technologies at the same college introduces opportunities in home entertainment, factory, office, communications, transportation, medicine, education, and sales and service industries. **[N]** Engineering Technology Orientation at St. Louis Community College exposes students to the various fields of technology through field trips, videos, and guest lectures, as well as providing materials, techniques, and colleges services which will assist students in completing a technology program. **[N]**

Other clusters of courses which blend career exploration, experience with representative job tasks, and developmental education have been described in Chapter 1 (Mass Bay Community College in Massachusetts; Indian River Community College in Florida; and San Jacinto Community College in Texas). In each of these, students become familiar with career opportunities and the multiple uses of technology while completing a variety of simulations related to specific workplace skills.

Of course, the most useful career exploration rests on informed decisionmaking, with students knowing the employment and transfer rates of a particular program at the local community college. Although every college is required to gather some type of student

retention and post-graduation data, we found only one college which reports placement and transfer data in a readily accessible format for students and employers to review. Based on an 88% survey response rate, Broome Community College in New York publishes information in each college catalog by academic or occupational major about post-graduation outcomes related to type and location of employment, range and average starting salaries, leading employers, and transfer colleges. **[II–80-82]**

Faculty and administrators who have reviewed the Broome public-reporting approach often balk at the effect such information would have on enrollment patterns in specific programs—especially those for which there is low employment potential or relatively low wages. However, programs which do not result in employment, either because of local labor market conditions or because the programs do not impart the kinds of skills sought by employers, nearly always merit careful review to ensure that students and the community receive the benefits they justifiably pursue.

CHAPTER 6
INCORPORATING EDUCATION FOR CITIZENSHIP: THE ECONOMIC, POLITICAL, AND SOCIAL ASPECTS OF WORK

While gen ed courses are widely required for Associate degrees in occupational majors, many instructors report that occupational students find such courses tedious and unrelated to their futures. Furthermore, such courses are independent of occupational coursework, forcing *students* to find the connections between their occupational concerns and the humanities and social science courses included in the typical gen ed sequence.

An exception to this pattern is Salt Lake Community College, where administrators and faculty redefined the purpose of general education to be "the integration of attitudes, skills, and broad abstractions of knowledge." **[N]** As a result, SLCC evaluated every course against a new criteria, with quality control resting in a joint academic and vocational faculty committee. In addition, SLCC instituted a five credit interdisciplinary course requirement outside of a student's major, opening creative learning opportunities. The outcome to date has been an increased enrollment in vocational courses by humanities majors and a more positive attitude about career studies based on the personal experiences of students who have met the interdisciplinary requirement through one of the college's active learning alternatives.

Electricity and Modern Living combines social science perspectives with hands-on activities in which students complete common electrical wiring projects and deliver a Power Symposium—a class presentation on an aspect of power generation or consumption describing tradeoffs and practicalities of that form of production or usage. Business and Society explores the changing role of business through the ages, culminating with a collaborative student group report on factors impacting the history and future plans of a local industry, community, or geographical region. Two other courses, Technology and Society and Enriching Our Living: Enriching Our Lives, combine historical, philosophical, and technological aspects of work and its impact on our lives. **[II–83-86]**

An active approach to history, in which students "do" history is in place in SLCC's Understanding History and history and political science classes at San Diego City College. The SLCC course is subtitled What History Is and What Historians Do, challenging students to debate whether Henry Ford was right when he said "All history is bunk." In the

same vein, students in the San Diego courses analyze reproductions of historical primary documents related to working conditions such as "Runaway Indentured Slaves" (*Virginia Gazette*), "Child Labor" (Massachusetts Senate), "Rules for Husbands and Wives" (Matthew Carey), "The Evil of Female Labor" (National Trade's Union) or "The Dangers of Immigration" (Samuel F. B. Morse). **[N]**

While other colleges have not taken such bold steps, some have developed ways of integrating the knowledge of economic, political, and cultural dimensions of our society into the college curriculum.

Of course, in a small way, the historical, social, and economic foundations of courses are naturally infused into introductory academic or occupational courses, with a chapter or unit related to the history, philosophy, or ethics of a discipline. Students encounter chapters about the history of psychology, of early childhood education, or of criminal justice. Discussions of ethics are as likely to occur in a business or environmental science course as in philosophy. Issues of supply and demand appear in both allied health programs and economics courses. But this is peripheral integration that does not show students how they benefit from general education.

A more explicit approach is the hybrid course that examines technological developments from multidisciplinary perspectives. Using a theme of technological change, a number of courses examine technology as a threat to freedom, religion, imagination, and nature versus the promotion of equality, democracy, rational thinking, and economic progress. Technology and Culture was jointly developed by humanities and technology instructors at the Technical College of the Lowcountry in South Carolina in 1991, and pilot-taught to industrial faculty to gain their views about how students might react to the class content and format. The course attracts both liberal arts and technology students, and guides them in understanding the intricate interdependence of technology and culture using atypical texts like *Walden* and *Jurassic Park*. An important outcome of the course is student awareness of the differential and unequal benefits of technology and their further consequences for social and economic divisions. **[II–87-88]**

A team-taught course encompassing historical, biological, physical, and engineering perspectives, Technology and Society at County College of Morris in New Jersey is taught for three to four weeks each by faculty from those departments. The course

is intended for non-science majors interested in the role of technology in shaping human history. **[N]** Nassau Community College in New York offers Issues in Science, Technology and Society, which examines how modern technology affects society and how social institutions shape the development and use of new science and technology. At Washtenaw Community College in Wisconsin, students explain concepts such as survival of the fittest, natural selection, specialization, and adaptability, and study artifacts used by humans as early examples of technology in a course titled Technology and Society. **[N]**

At the Pennsylvania College of Technology, faculty from Construction Technology, Business Administration, Computer Integrated Manufacturing, and History jointly designed a writing enriched history course titled Technology and Society. Students examine technology both as a social solution and a social question, making predictions about future technological change. A unique component of this course is a discussion of the ideological and historical dimensions of the changing work ethic in the United States from colonial times to the early twentieth century, including the influence of capitalism, rationalism, and Protestantism. Students read about the labor problems at Jamestown and public perceptions about the work ethic during industrialization.[18] The course uses on-line readings from the library at Stevens Institute of Technology, and a faculty-developed, computer-aided tutorial about the British Industrial Revolution. The midterm essay includes an analysis of ideological and historical influences on the student's personal work ethic (as identified on a work ethic survey), identifying how their own work ethic might create traps in their futures. **[II–89-90]**

Other hybrid courses concentrate on historical perspectives, exploring the role of technology and the importance of timeliness, chance, and the social and cultural setting in the development of technology and science.[19] Students are asked to illustrate the positive

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[18] Literature about work in general as well as the historical and moral aspects of work offers a rich literary tradition for occupational students to explore. The Pennsylvania College of Technology course uses historical reviews of the labor problems at Jamestown and studies of the American work ethic at the turn of the twentieth century, while other innovative courses focus on working class writing. **[II–91-92]** See also Koziol (1992) for an annotated bibliography of novels and short stories about work. At the same time, poorly prepared and delivered instruction can curtail the benefits of even the most interesting text. We thank Helena Worthen for reminding us of this.

[19] Representative courses include History of Technology (New Hampshire Technical College at Nashua) **[N]**, which traces the technological development through the ancient world, Middle Ages, Industrial Revolution, and the 20th century; Technology and Our Society, focusing on the cultural context; societal and environmental effects; and the importance of timeliness, milieu, and chance in technological development (Linn Benton Community College in Oregon) **[N]**; and The Machine in America, described as an introductory study of America's romance with technology and the role of engineering in American life,

and negative effects of automation on a worker, based on personal experience, and then to defend their view that the public policy should support, restrict, or remain neutral on the issue of automation. Historical perspectives sometimes emphasize a locality such as California's Industrial History (DeAnza College in California) **[N]** or Connecting Technology and Our Lives (Sinclair Community College in Ohio), which focuses on the history, underlying concepts, effect on community values, and quality of life resulting from technological development in the Dayton, Ohio, area. **[II–91-92]**

In other cases, the perspective is more specifically career-oriented; examples include History of American Health Care (Community College of Philadelphia) and History of American Architecture (Belmont Technical College in Ohio). Courses combining economics and geography are offered at Tidewater Community College in Virginia and Johnson County Community College in Kansas for environmental science students.

Similarly, ethics courses may be generic or career specific, with many business and allied health departments offering ethics courses appropriate for their majors. Business Ethics is the most common variation, offered at Butte in California, Monterey Peninsula in California, Johnson County in Kansas, Southwest Technical in Minnesota, Westchester in New York, and Colorado Mountain Community Colleges, and is team taught at Prince George's Community College in Maryland. Montcalm in Michigan, Illinois Central, and Ivy Tech–East Central in Indiana offer medical ethics courses, titled variously as Health, Medical, or Bioethics.

Transfer-level courses can combine political and career issues in Labor Studies. Los Angeles Trade-Tech College offers one and three semester credit transfer-eligible courses, including Labor History, Labor Economics, and Labor Communications. **[N]**

Although several colleges have established clusters of courses which include social science and humanities, few have addressed occupational concerns. A unique linkage at San Diego Community College was initiated by an accounting and a philosophy instructor

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and includes a unit on historical research and writing (DeAnza College in California). **[N]** At Salt Lake Community College, students explore the future impact of technology on the global culture and society in Future Studies **[N]** and at Washtenaw Community College in Michigan students are introduced to basic principles and methods to study technology in Technology and Society. **[N]** County College of Morris in New Jersey offers Technology and Society, taught by rotating instructors from history, biology, physical science, and engineering, each presenting a disciplinary view of technological change and its impact on society. **[N]**

who sought an avenue to collaborate, which resulted in a Workplace Ethics cluster. In a true example of authentic assessment related to both academic and career preparation outcomes, exam questions have provided a case study of fraudulent accounting practices, and students are asked to explain how Mills, Kant, and a philosopher of their choice would advise this employee. **[II–93-94]**

Associate-Level Programs

Because gen ed and citizenship preparation are dominated by the academic disciplines associated with transfer programs, there are fewer examples of integrating citizenship education into Associate-level programs. Many colleges infuse ethical considerations into occupational programs with a unit of study or student exercises. For example, students in the food service program at Cape Cod Community College in Massachusetts use a social responsibility audit to identify, analyze, and solve ethical dilemmas common to the industry.

Linked courses also serve as vehicles for understanding the nature of work life. Waukesha County Technical College in Wisconsin links two credits of Basic Workplace Psychology with eight credits of welding in a course combining the psychology of interpersonal relations with workplace applications. In addition to exercises in which they identify the adjustments a new worker must make, devise "survival" suggestions for new workers, and resolve stressful situations, students complete three Performance Reviews of their own behavior, based on an industrial model. To prepare the course, the psychology instructor interned at several welding firms to learn how the welding workplace operates, so that students could understand and practice appropriate uses of color, health, safety and interpersonal relationships on the job.

Similarly, Human Relations in Business forms a natural linkage with Introduction to Psychology at Allan Hancock Community College in California. Students compare intrinsic and extrinsic employee strategies with theoretical motivation theory; contrast reinforcement theory with rewards for individual and team performance; discuss business and psychological perspectives on a rating system for violence in children's television programming; and evaluate commercials that focus audience attention on the visual aspects of a product. **[II–95-96]**

These innovations indicate that occupational education and citizenship education need not be considered independent or even antithetical to one another—as they often are. The concerns surrounding occupations provide rich opportunities to examine the political, economic, and cultural dimensions usually incorporated in social science courses and gen ed requirements. The literature examining work is similarly rich and varied, and history perspectives—often quite unloved by students—can come alive through the perspectives it offers on the development of industries and occupations, technical change, and its effect on society. These integrated approaches to gen ed and citizenship education may provide the most effective ways of motivating students who are not inherently interested in conventional "academic" disciplines.

CHAPTER 7
MOVING FROM HERE TO THERE: THE REQUIREMENTS FOR IMPLEMENTATION

Although we have described some exciting innovations in workforce education, these changes have not occurred easily or quickly. Every college administrator and instructor with whom we spoke recounted barriers in the way of their successes, and universally they reminded us that these are reforms "in process."

The innovations we uncovered form a continuum—from heroic independent efforts on the part of individual faculty which influence the outcomes of only a few students, to institution-wide efforts that are broader in the range of skills they incorporate or the numbers of students they benefit. Even though the implementation process differs at each end of the spectrum, there is a shared stimulus: these reforms were largely generated by concern about the quality of student outcomes, rather than a more limited concern about career preparation. Both external and internal factors led to self-examination; in some cases, accreditation boards or employee advisory committees recommended stronger academic student outcomes, while in other colleges a leading administrator identified a need for program improvement. Some colleges received large grants to develop effective models of curricular innovation; other colleges funded very small projects out of general revenues.

In a few cases, state regulations have required the implementation of certain reforms. In these cases, however, community colleges have generally met but have not exceeded those requirements, or have implemented only minimal reforms.[20] Similarly, the Carl Perkins Amendments of 1990 have required that community colleges spend their federal funding for vocational education in programs "that integrate academic and vocational education . . . so that students achieve both academic and occupational competencies." However, federal guidelines are absent,[21] and in practice these requirements have been met either with minimal compliance or, quite often, largely ignored. Perkins funds have often been used for equipment purchases and other forms of

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[20] In two exceptions, colleges joined state guidelines with an established local initiative to improve student learning outcomes.

[21] While the 1990 and 1994 Perkins Acts prescribe the integration of academic and vocational education, federal definitions and guidelines have not been forthcoming. In practice, federal guidelines carry little weight because federal funds in postsecondary institutions is so small, accounting for less than 4% of local budgets for occupational education (Grubb & Stern, 1989).

updating vocational programs, and neither the state nor federal governments have bothered to see whether local colleges are complying with the spirit of this requirement. Of course, many colleges and technical institutes have inaugurated changes (both minimal and ambitious) on their own, and use state and federal funding for their innovations. Even so, the lack of a statewide or national consensus on the elements and strategies for comprehensive career preparation has left local colleges with little direction for their efforts.

Community colleges and technical institutes have taken several approaches in their efforts to develop more comprehensive workforce development programs. A minority of colleges have created a degree of unity between liberal arts and occupational divisions by locating offices near one another, or by forming joint councils (sometimes including counseling staff). Fifteen percent of the colleges in our survey have assigned both academic and occupational departments to a single Dean. Joint social activities also encourage informal relationships between faculty. "There is a free lunch" was the title of one such activity, in which meals in the campus dining hall were free to occupational instructors who made a lunch date with an academic counterpart (Orange Coast Community College in California). **[N]** The hope of these collegial processes is that contact among faculty members—never very common, at least in most community colleges—will lead to collaboration as faculty come to discover their mutual interests.

Occasionally, colleges incorporate formal mechanisms to foster cross-campus integration and innovation. To encourage holistic thinking about the entire college, at Macomb Community College in Michigan, administrators "manage" one of the college's missions, with responsibility to be a "resident expert" in streamlining governance and decisionmaking and to assure relevance across departments and disciplines. **[II–97-99]** "Constant, purposeful innovations and improvement" is a quality indicator of "Institutional Effectiveness" for the 1995-1996 school term at Salt Lake City Community College. **[N]**

More systematic and institutional changes have invariably been led by dynamic educational administrators, particularly those who have defined student outcomes in terms of competency rather than course completion. In these cases, an instructional leader, usually the vice president or dean of instruction or academic affairs, committed himself or herself to reform, gained information about alternative approaches through the college's professional development or self-study, identified a template for implementation, and then ceded authority for implementing these reforms to faculty. The particulars of the reform

vision varied, of course: some of these instructional leaders preferred the infusion of academic activities into occupational courses, while others emphasized a substantial redesign of general education, or linking career and liberal arts courses. However, without a centrally designed pattern for reform and support from the highest levels of administration, colleges have floundered—or the efforts of individual faculty have remained idiosyncratic and isolated.

To move into implementation, instructional leaders have generally passed authority to one or more faculty leaders, described by one administrator as "brave, courageous, and bold." In New Hampshire, these faculty leaders were called "System Fellows" and were appointed by the Commissioner of Higher Education. **[II–100-102]** At other colleges, department chairs or volunteer faculty were charged with formalizing a rationale and a planning process. A few colleges have provided mini-grants for faculty members to generate ideas for revised courses and programs; for example, Cape Cod Community College in Massachusetts granted $500 to faculty duos who submitted competitive proposals for infusing academic, work-related, or SCANS activities into courses. **[N]** Later in the process, colleges have often provided stipends or release time for the development of courses themselves. Like all implementation, the process of exploring possibilities and methods is often chaotic: colleges often describe this period as "fumbling through," "groping along," "hammering out," "a lot of little pieces coming together," during which faculty teams map out goals and methods appropriate for local conditions. Colleges reported a "halo effect" for *all* new conceptions until teams had enough information to sort out ideas, and complained that identifying experts for technical assistance was a problem for early innovators. Particular types of support from administrative leaders become critical at this stage—their presence during planning sessions, appropriate professional development to flesh out alternative models, and joint planning time for the faculty team—to overcome what one dean cited as an educator's dilemma: "I really would like to do this differently, but I don't have time or an idea of how to design something new." **[N]**

Two contrasting approaches characterize these implementation practices. One approach can be described as a collegial approach, in which change is inclusive, fostered for all faculty at a rate which they find comfortable. Conversely, Salt Lake Community College in Utah and Washtenaw Community College in Michigan **[N]** adopted an entrepreneurial approach, in which faculty willing to meet specified standards in course

competencies were granted approval for their course to meet requirements for graduation. In both approaches, quality control rested with a faculty committee, through review of course outlines, assessment methods, or student work samples.

Any change is accompanied by some risk, and college leaders can foster a culture of support for innovation. In developing new courses and teaching approaches for the Bridge Program at Indian River Community College in Florida, the Physics instructors commended administrators "for creating a supportive atmosphere in which I felt secure enough to take risks and make mistakes without fear of criticism or failure." [N] Usually, of course, such reforms are initially undertaken as pilot projects with only a few courses or instructors involved. The speed with which a pilot project is open to students varies greatly. Some colleges have arranged a four-year implementation period, while others have planned a one semester "roll out." Illinois Central allowed eight months for piloting a dozen linked courses [N]; Mississippi Gulf Coast [N] asked each faculty leader to design two integrated activities per semester; and teams at Fayetteville in North Carolina [N] jointly designed fifty activity guides during one school term.

Nearly every college adopting substantial innovations has planned for natural diffusion in which the reform effort spreads across the campus as other faculty become excited and elect to participate, since it is so difficult to force faculty to participate. Wausheka County Technical College in Wisconsin formalized diffusion by using faculty "advocates" to make presentations at department meetings and to work individually with instructors wanting to infuse core competencies into courses. Administrative leaders continued to provide leadership, as one replied, "accepting incremental change but keeping the heat on," while faculty teams planned and conducted reforms.

Regardless of the approach used, faculty and administrators report a change in the instructional culture of the college as a result of redefining student outcomes. Statements that the teams are "learning as we go along" and "learning from these experiments" reflect the pioneering nature of these achievements—as every college has cautioned us, the initial reforms are not final results, but, rather, ongoing negotiations in program design. Over time, such efforts may be able to change the culture of a community college toward one in which outcomes are taken more seriously, in which a variety of work-related competencies are explicitly provided, in which faculty collaborate in the development of programs and courses, and in which the vision of the community college as a "teaching college" motivates all faculty and administrators.

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APPENDIX
SOURCES OF INFORMATION

We began examining the integration of academic and vocational education in 1991 as part of the overall program of the National Center for Research in Vocational Education (NCRVE) to examine innovations in vocational education generally and those supported by the Perkins Amendments of 1990 specifically. This work began with a postcard survey of deans of instruction at 295 community colleges, drawn at random from the list of the American Association of Community Colleges; 168 responded, and 121 claimed to be engaged in some form of integration. Eileen Kraskouskas then interviewed 45 of these institutions during 1991 and 1992, concentrating on those with initial or particularly interesting descriptions, and we visited four of them. This research resulted in an NCRVE monograph (Grubb & Kraskouskas, 1992) and a briefer article in the American Vocational Association's journal (Grubb & Kraskouskas, 1993). This work has also formed the basis for a series of presentations at meetings of groups like the National Council for Occupational Education, the AACC, and workshops at various community colleges.

Norton Grubb was asked to conduct the research on curriculum integration for the National Assessment of Vocational Education. This involved developing questionnaires for high schools and community colleges to report the kinds of integration activities they were engaged in during 1992. The resulting monograph (Grubb & Stasz, 1993, incorporated into Boesel, 1994) clarified that there was increasing interest in curriculum integration, though it was still low, much lower than in secondary schools, and was principally confined to specifying general education requirements, the development of applied academics courses, and offering Writing Across the Curriculum. Curriculum integration was also more frequent in states that had developed specific initiatives and technical assistance, and in large and well-funded institutions. However, based on what we had learned from earlier research and from workshops, it also appeared that the answers to these questionnaires were often exaggerated: in many cases it looked like community colleges reported practices under development, or practices that they wanted to develop, rather than examples of curriculum integration already in place.

However, in 1994, interest in curriculum integration began to increase. Several additional states began to develop initiatives to require that local colleges use their Perkins funds for integration, leading to a increased demand on NCRVE for workshops related to

curriculum integration. In response, Norena Badway, together with Norton Grubb, began investigating more recent developments. Initially, we mailed letters to deans of instruction to 309 public community colleges and technical institutes (82% and 18% of the total, respectively), representing a random sample of one-third of the nation's institutions. They were asked to return a postcard checking a box if they integrated academic and vocational education in any way, with space for a brief description of practices in place and the name and phone number for a contact person. Following that, we faxed surveys to non-responders, achieving an 81% response rate. We then contacted by phone 122 campuses, concentrating on those with unusual or especially interesting descriptions, but not contacting those reporting gen ed requirements for graduation or common forms of applied academics courses. At each institution, we typically interviewed a dean of instruction and several administrative or faculty members, and requested samples of course outlines, learning activities, and examinations. Only 2% (6 out of 251) reported that they were not integrating in any way. We supplemented that information with site visits to Dutchess Community College in New York; New Hampshire Technical College-Laconia; Fresno Community College in California; La Guardia Community College in New York; and San Diego City College.

An additional source of information about curriculum integration comes from the workshops and presentations carried out for community colleges by Grubb, Kraskouskas, and Badway. Within the past two years, we have presented about 35 such workshops to individual community colleges and consortia of colleges in particular regions. These are, of course, primarily forms of technical assistance, not mechanisms of information gathering; but the comments of participants often reveal the kinds of efforts community colleges are making and what problems they face most often. The workshops have therefore helped us develop a sense of what is going on around the country—often difficult to do given the range and variety of community colleges, and the lack of systematic channels of information.

A final source of information is a larger study of teaching in community colleges and technical institutes, again supported by the National Center for Research in Vocational Education. As part of this study, a team led by Norton Grubb has observed the classes of about 300 community college instructors, interviewing them and their college administrators. As part of this study, we have observed a number of integrated classes—and we stress that what one learns from observations is much different from what course

materials reveal and what instructors say. Although the results of this study will be not be written up until later in 1997, they have also informed the current report.